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THESIS

MANAGEMENT RESEARCH TECHNIQUES

by

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PART I

INTRODUCTION

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INTRODUCTION

THE IMPORTANCE OF MANAGEMENT RESEARCH

Present-day business management makes heavy demands on the man equipped to conduct scientific investigations dealing with general management problems. The importance of management research is being more widely recognized every day. "Rule of thumb" and "hunch" methods of evaluating situations are no longer sufficient for the needs of most companies. So many variables enter into ordinary management situations today that specific factors are becoming increasingly difficult to isolate. An idea of the growing perplexities of management relationships and the interdependence of many factors in any production situation can be gained from the following quotation.

"It takes more than 'common sense' to determine whether the installation of certain conveying machinery combined with an incentive plan complicated by labor organization may be desirable at present basic wage rates, affected as everything may be by apprentice training, the trend in labor legislation, immigration restriction, the possibilities of increasing foreign markets, the invention of new machinery, the trend in capital costs, and so on, and so on." (1)

Not only is the management of a business becoming more complex, requiring greater attention to scientific methods of arriving at solutions to management problems, but management requirements themselves are constantly changing. Business is ever in a

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(1) Donald, W. J., "Management Research Methods and Qualifications," Harvard Business Review, January, 1927, pp. 150.

state of flux and unless constant and directed attention is given to methods and procedures dealing with scientific approaches to knotty problems, there is a continual danger that sales will dry up, expenses soar, and profits disappear. These changes are due to many factors, all of which call for a recognition of orderly and detailed management research procedure designed to measure and evaluate in advance the effect of such changes on individual enterprises.

Management or production variables arise principally from the constant search for increased income and lowered costs. Because of this impelling force every plan, program, or person engaged in a business must contribute, each in its own measure, to this ultimate objective of business and commercial economy. It often becomes necessary to evaluate any and all plans, programs, or persons to see whether or not they are helping the final determination of profits. Furthermore, it is often necessary to examine specific features of management mechanism in order to determine their contribution to this end. These requirements imposed on every enterprise under present-day competitive conditions call for the wide use of scientifically correct research procedures if proper interpretation is to be achieved.

W. J. Donald (1) says: "The purely technical engineering side of production no longer has a monopoly on the need for scientific methods of research. While there are companies which are satisfied to apply to labor symptoms a gloved hand where a

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(1) Ibid, pp. 150.

mailed fist formerly reigned, there are others whose investigations get to the roots of problems and effect changes of policy and practice as regards benefit systems, pensions, wage plans and rates, and everything else affecting the human factor in production. Some are willing to use selective tests which others in only partially similar situations have used with supposed success. Others devise their own tests for particular circumstances and test their validity against performance. Some companies adopt ready-made wage plans without analysis of their applicability and without measuring their effectiveness, and their executives are loud in their claims of achievement which they might or might not be able to prove. Not infrequently, without analysis the same plan is applied to all workers, even though in dissimilar jobs, and to jobs in entirely different lines of industry. Some companies adopt ready-made instructional material for training apprentices without analysis of the job difficulties of the particular industry or company."

Individual companies must be able to estimate rather accurately the effect of industrial changes on their own business. The continued development of new equipment and new manufacturing methods calls for a careful analysis not only of the technical and engineering aspects, but of the entire management picture since, for example, a new machine or new operation affects more of a business than the foundry or the machine shop. The effect of such developments on wage systems, personnel programs, organization policies, financial plans, and many other phases must be

determined and evaluated in advance. Likewise, a constant search for lowered costs and increased output must be interpreted in the light of effects and repercussions, not only on the business as a whole, but on specific phases of the business.

Thus is the importance of research evident in every corner of the entire production problem -- management as well as engineering. Too much money is tied up today, even in the small business, to permit widespread adaptation of economic and technical changes without first determining as accurately as possible exactly what such changes will bring. Industry cannot afford to experiment with new developments wholly by the trial and error method. Competition and the everlasting struggle for business makes necessary a more scientific evaluation of changing policies and new developments. An enterprise today must study first the problem as a whole, then decide upon a course based on the results of such investigation, and, finally, more important than all, continually check and evaluate the working out of the policy.

The increased inter-relation of business functions in the management of an enterprise today gives still another impetus to the use of management research and scientific techniques of investigating management problems. It is usually necessary to isolate specific situations before over-all effects can be secured. There is seldom a business problem of any moment which does not involve many elements of the management problem. A change in the design of a product, for example, generally calls

for new tools, new production methods, perhaps giving rise to altered wage incentive systems and involving a different training of workers. The ultimate advisability of a change, as a whole, can only be determined by a careful evaluation of all inter-related factors by one trained in the scientific approach to problems of this nature.

The growing problem of the human factor in industry embodies another reason for the added importance of management research to present-day business operation. Operating costs arising from this factor, both for wages and for industrial relations and personnel activities, are the one major operating expense that must be met religiously at regular, stated intervals. (1) Because of its importance, the dual problem of a reduction of this expense and a return for this outlay must always be the subject of careful attention. Wage incentive plans, hiring methods, organization policies, training programs, and personnel policies must give the results for which they were originally intended. Only by means of carefully thought-out scientific analyses of these activities can their over-all effects be noted and evaluated. Thus it becomes the function of the management research investigator to ascertain exactly the value of these activities and their ultimate effect on the Balance Sheet and Profit and Loss Statement.

THE LIMITATIONS OF MANAGEMENT RESEARCH

A word of warning is in order at this point. The primary

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(1) Jones, Albert. American Bankers' Association Journal. June, 1932, pp. 742.

tool of management -- judgment -- does not lose any of its force because of the growing recognition of the value of research in solving general management problems. Pertinent facts such as discovered by the management research investigator are in nowise intended to take the place of sound judgment. Such facts and other results of scientific analysis should always be used as an aid to final judgment in making decisions. No management research findings should ever be utilized if they run counter to reliable judgment. Many factors in the intricate management problem can never be measured or at least can only be approximated. There still is no substitute for sound judgment.

THE DEVELOPMENT OF SCIENTIFIC MANAGEMENT PRACTICES

Both management and commercial research methods and techniques have followed rather closely the development of modern industrial life, though such development has not been as spectacular or newsworthy as scientific and technical developments and inventions. When transportation development reached the stage where goods could be distributed quickly and economically to distant points, the mass production era came into being. Originated at approximately this time and growing apace with manufacturing and commercial development, the scientific management movement has made great strides, especially in the past twenty years. Perhaps the fundamental impetus to the scientific approach to management problems has come about as a result of the predominance of engineers and engineering

trained personnel in the early development of a large number of present businesses. Mr. Donald says: "The engineer has been a power for decades. For a long time, to be sure, he functioned as an advisor, first largely as a consulting engineer, and later more and more as a full-time member of the staff of a company. Of recent years a rapidly increasing percentage of line executives in factories, railroads, and public utilities have been drawn from the engineering profession." (1)

He questions, however, the popular belief that the success of the engineering profession in industry has been due principally to their grasp of particular fields of knowledge. "Rather," says Mr. Donald, "engineers won their present place in corporate organization chiefly because they had acquired a technique of investigation which is essential to modern manufacturing and utility operation. The processes of analysis which are applicable in engineering or in chemistry are fundamentally alike for all. These processes are the discovery and verification of facts, scientific methods of analysis of facts, and the discovery and proving of relations of cause and effect. The devising of solutions of problems thus analyzed, experimentation with devices to meet the situation under investigation, and the measurement of results of experiment are the closing chapters in the application of those scientific methods which sound engineering training provides." (2)

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(1) Donald, W. J., op. cit., pp. 149.

(2) Ibid., pp. 149.

In support of this concept of the place of the engineer, in present-day industrial economy, is the role which engineers played in the actual development of scientific management methods and research techniques. A brief statement of the high points of this historical development is outlined below under five principal headings.

1. The Scientific Management Movement.

The scientific management movement had its beginning when Henry R. Towne read a paper, "The Engineer as Economist," before a forum meeting of the American Society of Mechanical Engineers in 1886. (1) It was natural that such a beginning of scientific management principles should originate with an engineering body. In the first place, engineering organizations were the only associations of practical industrial people which existed at that time. Present-day management societies and trade bodies were of more recent organization. (2) Furthermore, it was natural that these developments should originate with the engineers because the pressing management problems of the day involving the co-ordinating and supervising of workers scattered among new machines were problems of the engineers' own making. Not only had they designed and produced this new equipment, but they were usually responsible for its operation as well. Fred W. Taylor joined the American Society of Mechanical Engineers in 1886, and in two notable papers, "A Piece-rate System," in 1895, and "Shop Management," in 1903, laid the groundwork for the real development of the scientific management

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(1) Taylor Society, Scientific Management in American Industry, pp. 6.

(2) The Taylor Society was founded in 1912; The American Management Association in 1923.

movement. The later aspects of the movement are really an outgrowth of the four fundamental principles set forth by Taylor in 1911. (1)

"1. The development of a true science.

2. The scientific selection of the workman.

3. His scientific education and development.

4. Intimate, friendly co-operation between the management and men."

Mr. H. S. Person has expanded these rules of action and describes the scientific management movement as follows: (2)

"1. The use of research, investigation and experiment (with their processes of analysis, measurement, etc.) in determining and appraising the facts of managerial situations; and the use of these facts in establishing objectives, policies, projects, plans, and procedures.

2. The substitution of the known for the unknown, the constant for the variable, i.e., the establishment of standard factors in the managerial situation in terms of which may be made calculations and plans which may be expected to come true.

3. The establishment of a control which both directs the researches, establishes and maintains the standards, makes the plans and controls co-ordinated efforts for consumation of the plans.

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(1) Taylor, Frederick W., The Principles of Scientific Management, pp. 69.

(2) Person, H. S., in The Cost and Production Handbook, pp. 1328.

Subordinate to and supporting these principles and rules are many others, such as the exception principle, the separation of design and execution, the securing of workers' good-will, the recording of process methods, etc."

2. Time and Motion Study.

Time study was first applied by Taylor between 1880 and 1901 when he was with the Midvale Steel Company, Philadelphia, Pennsylvania.(1) His technique was developed for the purpose of isolating the different parts of any particular operation and determining exactly how each part could be handled more efficiently. He used the stop watch for this work and in a paper before the American Society of Mechanical Engineers brought time study possibilities to the attention of industrialists. (2) It was many years after this, however, before time study methods became generally accepted.

Motion study was first developed about 1905 by Frank B. Gilbreth as an outgrowth of Taylor's time study methods.(3) Gilbreth, a construction engineer, believed that time study had little value unless a general record of all motions could be made. He began his studies by analyzing the movements of bricklayers employed on his construction jobs, later using the motion picture camera to record every motion detail concerning a specific operation.

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(1) Taylor Society, op. cit., pp. 3.

(2) "A Piece-rate System," 1895.

(3) Lytle, C. W., Wage Incentive Methods, pp. 100.

3. Economic Lot Sizes.

The use of scientific methods of analysis in the determination of optimum manufacturing and purchase lot sizes under actual operating conditions was first developed by George B. Babcock in 1912 when he was installing the Taylor System in the H. H. Franklin Company, Syracuse, N.Y.(1) Mr. Babcock pioneered formulae and curves which were the forerunner of the present-day development of this subject. In recent years, Professor Frank L. Eidmann and Professor Fairchild Raymond have been most active in this work.(2)

4. Budgetary Control and Profit Planning.

Although budgetary technique has been widely accepted since the turn of the 20th century, it was not until the appearance in 1922 of James O. McKinsey's book, "Budgetary Control", that the subject received any definite treatment. Prior to 1922, budgetary control was largely a matter of individual practice and adaptation. In more recent years, the subject has been given a great deal of attention, however. Profit planning, the term generally applied to the technique employed in predetermining profits, is of comparatively recent origin. This technique was first definitely stated by C. E. Knoeppel in 1932.(3) The break-even chart which forms the basis of profit planning was developed by Mr. Knoeppel in his private practice about 1909. (4)

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(1)Raymond, Fairchild. Quantity and Economy in Manufacture, pp.119.

(2)See Raymond, Fairchild. op. cit., and Eidmann, Frank L., Economic Control of Engineering and Manufacturing.

(3)See Knoeppel, C. E., Profit Engineering.

(4)Ibid., pp. ix.

The basic idea of engineering of profits was first begun around 1921. Profit planning, however, cannot at present be said to be on a scientific basis.

5. Wage Incentive Plans.

The early use of scientific principles in business management is illustrated by the development of wage incentive plans. This phase of management from the beginning provided a practical arena for experimentation and investigation. The origin of single piece-rate methods of payment is obscured in history. In all probability, such methods were first developed on a practical operating basis during the time of the Guilds.(1)

The first known statement of a piece-rate plan designated as such was by Adam Smith in 1776.(2) However, it was not until the beginnings of the scientific management movement during the latter part of the 19th century that important refinements were made on the fundamental operation of these piece-rate plans. It was Mr. Taylor himself who first devised an empiric adaptation of the piece-rate plan. Concerned primarily with providing a substitute for close supervision of employees, Taylor, about 1884, put to practical use his "differential rate system of piece work," later, in 1895, calling it the "differential piece rate plan." (3) Taylor's associates, L. G. Gantt and L. B. Merrick, modified his plan in certain respects, but

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(1) Lytle, C. W., op. cit., pp. 164.
(2) Ibid., pp. 166.
(3) Ibid., pp. 198.

the fundamental basis remained Taylor's.

It was not long until other plans were devised. In 1890, Fred Halsey, an engineer in the employ of a drill manufacturing firm, developed from an idea first presented by Henry R. Towne a method whereby gains from efficient operation were distributed to workers on the basis of percentage of task performed.(1) This procedure outlined by Mr. Halsey in a paper (2) before the American Society of Mechanical Engineers in 1891 did not gain wide acceptance until the turn of the century but has since spread rapidly. A further refinement of the plan was developed about 1898 by James Rowan, a Scottish manufacturer, who devised an algebraic method of sharing gain rather than the straight arithmetic method used by Halsey.(3)

Another step in the development of wage incentive plans was taken by Harrington Emerson about 1904 when he altered the original Taylor and Gilbreth systems by spreading the incentive between low and high task points rather than using a single incentive at high task. Incidentally, it is interesting to note that this system was devised during a strike at Mr. Emerson's company, the Santa Fe Railway, and was influential in obtaining an early and peaceful settlement of the strike. (4) Charles E. Bedeaux demonstrated another refinement of this idea in 1916 when

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(1) Ibid., pp. 226.
(2) "The Premium Plan for Paying Labor."
(3) Lytle, C. W., op. cit., pp. 290.
(4) Ibid., pp. 304.

he devised a system guaranteeing time wages up to a high task and providing a constant share from there on.(1)

One could trace indefinitely the historical development of wage incentive systems and their general relation to scientific methods of solving management problems, but the above brief description covering the high points in this evolution is sufficient for our purpose. It is by no means intended to be complete. Experimentation and investigation concerning wage incentive plans continue all the time in nearly all businesses in the United States, both small and large. Modification of existing plans are constantly being made to fit special situations. Some of the methods used in analyses of this type are described later on in this paper.(2) Suffice it to say at this point that work in this phase of management has provided a major impetus to management research in other fields.

REASONS FOR DISCUSSING MANAGEMENT RESEARCH TECHNIQUES

In the field of general management research there exists no definite body of opinion regarding general investigative techniques and procedures. Ample work has been done in specific fields, but nothing in a broad statement summarizing basic procedures and methods. Perhaps the field is too wide for such a statement, but as will be shown presently,(3) there is a definite need for some kind of a beginning to the problem of formulating

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(1) Ibid., pp. 250.
(2) Cf., pp.58 ff.
(3) Cf., pp.29 ff.

a basic approach rather than dealing exclusively with specific situations. If a general technique can be devised applicable to any management problem, a great forward step would be taken in the development of management principles.

Many factors peculiar to present-day business operation can be cited in defense of the contention that a technique of investigation in general management problems, rather than a plan of investigation, is the important thing to stress in any discussion of management research. In the first place, experience, hunch, and "rule of thumb" methods in the operation of a business are not enough today. Many of today's problems are entirely new, requiring a diligent appraisal of facts before solutions can be reached. Accordingly, it appears that attention given to a technique of investigation that will be useful in all situations is more valuable than effort falling short of this fundamental procedure. Basic knowledge of many management situations cannot be gained in all cases by arbitrary judgment. Rather, judgment must be supplemented by investigation which seeks to get at the core of the problem and to treat every factor in its true relationship.

Furthermore, as a result of the increased inter-relation of business factors [1] it appears to be evident now that often an actual knowledge of factors affecting management solutions and decisions is not sufficient for real needs. The main problem, rather, is to determine what specific steps should be taken

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(1) Cf., pp. 5 ff.

to isolate, analyze and weigh these factors. For example, an organization policy of a company might be well stated and procedures definitely enforced, but how is one to determine the effect of such a policy on other phases of the management problem? Or, it is well known that personnel programs cost tangible money and yield intangible returns. But how can these returns be measured and evaluated? Likewise, training programs affect labor efficiency and manufacturing costs. But how is one to measure these effects? A knowledge of the technique of scientific investigation as applied to the above two or three general management problems is exceedingly important if management is to be fully informed concerning these important factors.

Finally, a discussion of management research technique is necessary because it tends to supply something that is permanent and universal. Management methods themselves are constantly changing. New situations and new relationships are always arising. Because of their transitory nature, management methods alone are not permanent tools that can be used safely at all times and under all conditions. Knowledge of general investigative techniques, however, have a more permanent value. They provide a tool common to the entire field of management, generally useful at all times and under all conditions. By thus getting to the root of the problem, by challenging mere impression or habit, not only are management methods improved, but an inquiring point of view is engendered which should prove a valuable executive trait at all times.

OBJECTIVES OF THIS PAPER

Accordingly, the primary objective of this paper is to bring out the importance of investigative techniques as pertaining to general management problems and situations. Throughout these pages, effort has been made to stress the importance and method of investigation, both for general management problems and for specific situations. It is readily admitted that the ramifications of the average production situation make any statement of general investigative techniques somewhat thin for immediate and practical use, but if a beginning can be made--if an impulse to verify facts can be generated--the primary purpose of this paper will be achieved. Presumption concerning management methods has altogether too little validity, yet it is altogether too widely in evidence.

Supplementary to this primary objective, it is the purpose of this paper to set forth general investigative techniques,- to attempt some kind of general research procedure that will be common to all management situations. To illustrate the above and to suggest possible adaptations of investigative techniques, a great deal of space is given to general procedures to be followed by the management research investigator in the collection and analysis of facts pertaining to certain phases of management; namely, general organization policies, wage incentive plans, personnel programs and training procedures.

A final few pages of the paper is devoted to a summary of principal conclusions brought out in the body of the thesis,

and a statement concerning the value of academic training in management research technique. A suggested educational program for such academic training in this field is offered, together with a paragraph or two dealing with vocational opportunities and the type of man needed for management research.

PART II

BODY OF THESIS

Section I.

THE FUNCTIONS OF MANAGEMENT RESEARCH

Management is as dependent on research and fact-finding in matters of organization and policy as the chemist or physicist in matters of chemical or physical investigation. The day has passed when practical experience can solve all of the many perplexing situations that face factory and business executives today. Not only are many situations and problems much more complex than can be reasonably answered by experience or rule of thumb, but a true evaluation can usually be achieved only when an impersonal and scientific analysis of available facts is made. Thus the only real and true function of management research is the application of impersonal and scientific analysis to general management problems of organization and policy. Management research is not concerned primarily with specifying decisions, but rather with furnishing facts and the proper perspective of these facts, both of which make true and correct decisions possible.

A corollary of the above stated function of management research is found in the dynamic characteristic of industry and management. It is not enough that research and investigation point the way to correct solutions of knotty and complex problems. The function of management research does not end here. Rather, the same principles of accurate and impartial fact-finding must be further utilized to constantly test and evaluate all decisions in matters of organization and policy, to the end that management will not only start on the right track, but will keep on the right

track as well.

TO APPLY IMPERSONAL ANALYSIS TO MANAGEMENT PROBLEMS

Management research in its function of applying impartial and scientific analysis to matters of organization and policy must necessarily deal with a multitude of factors. Every problem, every decision, and every fact necessarily raise specific questions peculiar to the problem at hand. Obviously, it is difficult to suggest specific treatment of particular situations, but an idea of the general nature of such investigation can be gained by examining in brief a few principal directions of investigative procedures. These are grouped under five headings and cover in general the scope of the primary function of management research.

1. As a Means of Discovering Unsound and Inefficient Practices.

An important use of management research techniques in industry is the searching out of unsound and inefficient practices which are not readily apparent in the every-day workings of a business. In day-to-day operation, some procedures become so set that unsatisfactory and inefficient results go unnoticed. These unrecognizable inefficiencies are seldom detected unless discovered in connection with another factor. Organization and policy engineering is constantly employed in discovering and improving such practices.

2. As a Means of Determining What Are Necessary Facts.

Management research aims also to provide a basis for determining the validity or effectiveness of facts that might appear to be compatible with the problems at hand. In other words, the management investigator seeks to answer the question: "What are the necessary facts?" The problems confronting the investigator differ qualitatively from the problems in other forms of research. In the first place, the situation at hand is generally abstract, if it is known at all. Furthermore, the problems confronting a management research investigator are usually made up of a number of inter-related factors, no one of which holds the key to the solution. Thus it is apparent that information which must be gathered will necessarily be limited to valid facts if the investigation is to prove of any value. A proper application of management research techniques provides an objective and a method of investigation, both of which definitely tend to confine the collection of facts and their analysis to the problem at hand.

3. As a Means of Discovering Relations of Cause and Effect.

Management research is concerned with relations of cause and effect in problems of operating and organization policy. Sometimes, the origin is known but the effect is obscure. In other instances, the effect is known but the cause is indistinguishable. It is the task of the management research investigator to seek out actual relationships so that improvements and changes will always be in the right direction.

4. As a Means of Discovering Optimum Relations.

Management research is also concerned with discovering and proving optimum relations. For example, the economist tells plant executives that labor and machinery should be used in that combination which results in the lowest cost of production. (1) How is management to determine a proper combination that will get these results? What information will management need? What are the steps to be taken in solving such a problem? Likewise, training programs, organization policies, wage incentive plans, and personnel programs must contain just so much of certain factors or the other results which they seek to obtain are nullified. Such determination is part of the management research investigator's work.

5. Proposing Solutions to Management Problems.

Finally, management research is concerned with laying before management technically correct solutions or recommendations for any problems undertaken. Even though such solutions are not always definitely applicable to the problem at hand, a theoretically sound proposal will generally serve as a basis from which an operating executive can arrive at a practical and usable solution.

TO TEST AND EVALUATE POLICIES AND PRACTICES.

The second principal function in management research is to continually test and evaluate existing policies and practices. No factory or business can stand still. A thousand and one forces are continually pulling from a thousand and one directions. A

(1) See Slichter, Sumner H., Modern Economic Society, pp. 608.

plant must be flexible so that its affairs can be readily adjusted to lessen stresses and strains which are brought on by new conditions and situations, both internal and external.

This function of management research takes many forms. All phases of organization and policy come within the scope of the management research investigator's work. As stated before, the primary function of management research is to apply impersonal analysis to management problems. (1) But equally important as an objective is the continual task of testing and evaluating existing policies and practices.

A summary of the more important uses of management research in this connection is presented below under four headings:

1. As a Substitute for Historical Determination of Executive Policies.

Because of rapidly changing conditions, a policy or procedure which worked well in the past will not always work well in the present. It is often necessary to disregard past results of certain phases of executive policy in determining what is best for the future. Consequently, there is a growing need today for facts and definite investigations before many policies and general procedures can be determined. Decisions cannot be based primarily on past performance. As a result, research is necessary as a substitution for historical determination of policies.

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(1) Cf., pp. 22.

An example of this need is found in the experience of firms renewing training programs after a suspension of these activities in the 1931-1933 period. A training procedure effective in the past sometimes would not meet present-day needs. A great deal of effort has consequently been expended in determining exactly what training programs will more effectively and more economically accomplish the desired results.(1) Of course, this does not imply that past experience is to be disregarded altogether. It is merely a recognition of the value of determining in advance as far as possible what good points should be preserved and what changes should be made.

2. As a Means of Determining the Effect of Changing Conditions.

A second use of management research methods and techniques is found in the continual necessity of determining and measuring the effect of changing social and economic conditions upon an enterprise. Such changes are constantly taking place, and unless specific effects are analyzed in terms of existing policies and procedures, a firm will often awake too late to the realization that it is hopelessly behind the times.

An example of the use of research in this connection is found in the recent decision of the American Steel and Wire Company to abandon its Newburgh blast furnace and open-hearth plant in Cleveland.(2) Shut down for almost three years because of a severe falling off in business, it appeared possible several

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(1) Dutton, H. P. "Employee Training", Factory Management and Maintenance, February, 1936, pp. S-181.

(2) Based on recent conversation with equipment sales engineer. Verified by newspaper accounts.

months ago that the plant might be reopened. However, the management first undertook a thorough study to determine the effect of changed conditions in the steel industry on this particular plant. They soon came to the conclusion that it would cost more to place the plant on an efficient basis than they could possibly hope to earn from the plant over a period of several years. Based on this investigation, the decision was then made to make the shutdown permanent.

3. As a Means of Determining Further Economics.

The management research investigator is often called upon to determine where further economies can be made when no further economies seem to be in sight. This has been especially true in recent years. Faced with the necessity of reducing costs while improving service or quality, business has had to watch every penny. Original economies were easy, but now it is a case of reducing costs still further. This can generally be accomplished only by detailed analyses and investigations designed to weed out every item of cost that could possibly be done away with.

4. As a Means of Improving Service and Increasing Sales.

A final use of management research is to be constantly on the lookout for ways and means of improving service and increasing sales. Not only is there a permanent need of reducing costs, as stated above, but a firm today must also be forever improving service and at least maintaining, if not increasing, sales. To

accomplish these results, it is necessary to carry on an almost continuous research and investigative program designed not only to increase the saleability of a product or service, but to determine operating, equipment, and personnel improvements necessary to gain the required objectives.

Section II

GENERAL INVESTIGATIVE TECHNIQUES

Investigation of particular management problems, which comprises the function of management research takes many forms, as will be brought out in subsequent sections of this paper.(1) Because of this fact, it is almost impossible to set forth any specific investigative procedures that will be applicable to all situations. However, there are certain fundamentals common to all forms of management research. These are applicable whether applied to a wage problem, a market problem, a personnel problem, an organization problem, or any type of management situation.

A STATEMENT OF GENERAL INVESTIGATIVE PROCEDURES

A valuable statement of general investigative techniques has been given by Professor Leffingwell, a pioneer in this work as applied to office practice. Summarized they include the following six points.(2)

1. A Definite Objective.

This is the starting point of all management research and as such deserves first place in any statement of general investigative procedures. There must, first of all, be a definite purpose for which the investigation is being undertaken -- a specific reason for the effort. In general, the objective must be limited. In most cases a specific project cannot hope to

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(1) Cf. 39 ff.

(2) Main headings taken from Leffingwell, Wm. H., Office Management, pp. 36.

discover all there is to be discovered regarding a particular subject. As Professor Leffingwell puts it: "The objective may or may not constitute the entire major purpose and may for the time being be confined to some definite area within that main purpose and the analysis concentrated upon that area as the immediate objective."(1)

2. A Careful Study of the Objective.

This step is an important corollary of the first step listed above. In actual practice, it is sometimes not enough to have a definite objective in mind at the beginning of an investigation. It is usually necessary, after the study has begun, to go over the objective in its original form, modifying or changing it to suit available information and practical conditions. Professor Leffingwell points out that it is sometimes necessary to repeat this procedure several times during the course of a study.(2)

3. Analysis of the Problem.

A careful analysis of the exact information that is to be collected is the third step in Professor Leffingwell's statement of general investigative techniques. After the objective has been determined and carefully studied, the management research investigator must then map out the problem as a whole so as to determine what information should be obtained and the steps necessary to obtain it. A careful analysis of

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(1) Ibid,, pp. 37.

(2) Ibid., pp. 37.

the problem in the beginning is a safeguard against spending time and money in obtaining information not necessarily needed to attain the objective of the project.

4. Collection of Data.

The next step, logically, is to actually collect the data necessary for the proper investigation of the problem. Such collection, of course, takes many forms. Sometimes a problem requires data already available in the records of enterprises; sometimes it is necessary to search out important secondary sources. In other cases, primary data must be obtained which involves a series of observations, interviews, or experiments. In any event, whatever data is collected must relate directly to the objective of the study or have a direct bearing upon it.

5. Accurate Record of Data.

Almost as important as proper collection of data itself is the necessity in any type of investigative or research work of having clear, complete and accurate records of all data assembled during the study. This is a step often neglected by the investigator, especially in industrial and business fields where management research is sometimes a side-line to be carried on together with other activities. Not only should there be an accurate record of all data, but there should be a record of the progress of the investigation itself. Effective management research technique includes a knowledge at all times of exactly what has been accomplished and what remains to be done for any particular research problem.

6. Interpretation of the Data.

If the objective of the study is not indicated by the data itself, there should be a thorough and exhaustive study of the facts. Sometimes the management research investigator who collects and assembles the data is not the one to interpret the facts. In any event, whoever is responsible for the results and conclusions of the investigation is usually dependent on the completeness and reliability of the data and information as it was originally collected.

Although Professor Leffingwell's six steps, as stated above, present a rather complete general procedure to be followed in any management research investigation, there are several additional points which might be stressed in order to make this general statement as widely applicable as possible. These additional techniques, demonstrated to be practical in the writer's experience, are not intended to be all-inclusive, but they do round out Professor Leffingwell's statement of general investigative tools, as outlined above.

THE PRELIMINARY SURVEY.

There should be a preliminary survey prior to undertaking any specific problem. Although such a preliminary survey is not always practical in many types of management research, it is nevertheless important that some kind of a background be determined before actually beginning the work at hand. A preliminary survey as described here normally takes into consideration three important factors.

1. Examination of Existing Literature.

There should be an examination of existing technical and management literature on the subject. A most important single source for this purpose is, of course, the Industrial Arts Index, but care should be taken, however, to avoid the danger of missing pertinent reports because of the very detailed classification of subject-matters in the Index. In some cases a single subject listed in this Index will have as many as fifty related classifications in other alphabetical sections of the volume.

2. Discussion with Experienced Individuals.

A second factor to be included in a preliminary survey before undertaking a management research problem is a discussion of the question and objective with persons experienced in the field. Many valuable suggestions regarding the study can usually be gained by this means that would never be obtained otherwise. No matter how experienced a research investigator might be in the field, it is a fundamental axiom of this type of work that other persons can usually contribute many valued points.

3. Examination of Company Files.

A third factor to be considered is an examination of the files of the company itself to see whether or not there have been in the past any reports bearing on a particular subject. Because of the relatively high management turnover in many concerns, such reports or studies are commonly lost or misplaced.

A preliminary survey along the lines suggested above is an important step fundamental to management research technique. Not only does it serve to clarify the objectives and to point the way for an efficient handling of the project, but it sometimes reveals hitherto unknown reports and studies which might even make further investigation unnecessary. In any event, a preliminary survey will usually indicate short cuts or new approaches which would not otherwise be noticed. More important than this factor, however, a preliminary survey gives a perspective to the entire subject. Sometimes certain phases of the problem are discovered to be more important than others, or individual aspects might even outrank in importance the subject first proposed.

An experience along this line is quoted by Glen A. Bowers, Director of Research, Industrial Relations Councils, Inc.(1) He says:

"When a certain company tackled the question of pensions for retired employees, it soon developed that a pension is only one of several items involved in the financial "independence" of the aged worker. The whole field of employee-employer financial relationships was then mapped out for coordinated study to include such things as group insurance, financial investments, savings plans, home ownership, mutual benefit association, and the relation of these to wages and earnings. Furthermore, a brief survey of the pension problem

(1) Bowers, Glen A., in Handbook of Business Administration, pp. 1045.

as encountered in other companies brought out the fact that there is as yet no generally accepted solution and that the study needed to be tuned in with the findings of similar investigations in other companies."

VERIFICATION OF FACTUAL DATA

In addition to a preliminary survey, there is another factor which should be added to Professor Leffingwell's statement of general investigative techniques common to all management research. This factor might be termed a logical verification of factual data. It implies a careful study of all factual data and textual presentation of factual data before making up a final report. It does not mean that all data should be re-examined for accuracy. Such accuracy should be determined during the collection of the data. However, the management research investigator should, as a cardinal principle of his investigative technique, undertake a careful and judicious review of all findings to determine whether or not any data is misrepresented or whether or not all the significant features of the data have been brought out. Particularly in long and detailed studies is it necessary to check the data for consistency. The typical management executive will often be so affected by one small inconsistency in the presentation of the management research investigator's findings that the value of the report as a whole will be greatly diminished.

In this connection one other observation might be made. It is always well to complete the factual and descriptive portions

of a research report before drafting conclusions and recommendations. In management research, facts must always be separated from opinion, and though conclusions are always forming in the mind of the investigator throughout the collection and analysis of data, every effort should be made to handle the factual phases and the conclusions as two entirely separate pieces of work.

PRESENTING REPORTS TO EXECUTIVES

A final factor regarding general investigative technique common to all types of management research deals with the presentation of the final report itself. Although at first glance the mere detail of presenting a research report to the executive concerned does not seem to be important, in actual practice it constitutes an important part of the investigator's technique. Many an excellent report has found its way into a pigeon-hole or waste paper basket simply because the person doing the work did not know how to correctly bring it to the attention of the executive concerned.

A few suggestions regarding the presentation of research reports are made below which should pave the way for a sympathetic reading of an investigator's findings.

1. General Appearance.

Though this point seems too obvious to be stated here, its importance cannot be over-emphasized. The general appearance of the report and the arrangement of contents should be neat and orderly. As one practical investigator says: (1)

(1) Bowers, Glen A., op. cit. pp. 1049.

"A piece of work involving several hundred dollars or more in salary and other costs deserves a decent cover and typography."

2. Summary of Findings.

There should always be included in the front part of the final report a clear, brief, and to-the-point statement of the principal findings. Busy executives are not interested in rambling introductions. They want the principal facts and the sooner the research investigator gives them these facts, the more likely is the report to be sympathetically received.

3. Bring Out Effect on Profits.

No management research report is likely to have a good reception unless it deals with policies or problems that will contribute favorably to the annual income statement. Management is principally interested in profits and will generally have an open mind to investigations which have a direct bearing on increased earnings or decreased expenses. This does not imply that balance sheet relations should be brought in by the horns where no such relations exist, but it is a recognition of the fundamental objective of any management research project and as such deserves attention.

4. Presenting Results in Management's Own Language.

High-tone phrases and technical interpretations are not the language of the average executive, and as such should never be used by the management research investigator in presenting research findings. Results should always be expressed in popular language. In fact, one of the most difficult tasks of

the investigator in writing reports is to guard against statements which are probably clear to the investigator himself but incomprehensible to the reader not closely in touch with the subject-matter.

Section III.

EVALUATING ORGANIZATION POLICIES

IMPORTANCE OF AN ORGANIZATION SURVEY

A periodic organization survey is an important adjunct to proper management and control of a business. Organization policy and organization effectiveness are perhaps two of the most important responsibilities of management. Effective personnel and strong general policies are useless when fitted together in a loose hodge-podge of non-related associations. To be effective, the different parts of an organization must be tied together into a strong co-ordinated group with lines of authority and responsibility definitely drawn.

A complete organization survey is important for many reasons, but generally cannot be effectively undertaken unless certain general techniques are followed closely. As stated previously, any scientific analysis must start out with a definite objective.(1) While an organization survey might be directed in some instances to a specific objective, usually such an investigation is utilized mainly for tying up loose ends which perhaps have developed unknowingly. Thus it is that an organization survey is particularly applicable to checking inefficient tendencies which develop without knowledge.

Furthermore, the survey in itself provides valuable knowledge of necessary functions. In many instances, a complete checking over of functions in a business provides a type of in-

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(1) Cf., pp. 29.

formation which would not otherwise be available to the executive. So many times small and apparently unimportant functions, when seen in the clearer light of an organization survey, take on added importance in the efficient operation of the business.

An organization survey, further, is valuable in that it re-defines responsibilities and duties of executives and other members of personnel who are charged with performing the necessary functions. Many times in the day-to-day operation of a business, some functions through disuse lose their original purpose and become neglected in the ordinary pursuit of one's duties. An organization survey serves to focus attention upon these neglected responsibilities and duties so that their true place in the affairs of the business might be again recognized.

FACTORS TO BE TAKEN INTO CONSIDERATION.

In any organization survey or management research program designed to tie up loose ends in the organization of a business, there are four definite factors which must be taken into consideration.

1. The Objectives of the Existing Organization.

The objective of the organization must be clearly understood before plans for the survey can be undertaken. Organizations differ in different businesses. A banking organization is designed to perform functions which differ considerably from the functions required in a factory.

2. Analysis of Responsibilities and Functions.

An organization survey must undertake a rigid impersonal analysis of every function in the organization. These

functions must be set forth in a clear and concise manner covering all necessary information about each one of them. The various inter-relations and inter-responsibilities must be clearly brought out.

3. Analysis of Lines of Authority.

Next, the management research investigator must designate personal authority for the above-mentioned responsibilities and functions. In other words, these functions must be translated into terms of individual responsibilities. Lines of authority must be clearly shown and responsibility for functions must be specifically designated.

4. Analysis of Personnel.

After having defined the objectives of the organization, analyzed the responsibilities and functions necessary to achieve these objectives, and set forth lines of authority which designate personal responsibility over the necessary functions, the final step in an organization survey is to analyze the existing personnel and their effectiveness in handling the responsibilities and functions which have been set down as being necessary. This factor raises the question of executive ratings and the efficiency of various departments.

TECHNIQUES OF ORGANIZATION SURVEYS.

An organization survey in a going concern consists of four definite steps. These are:

1. Examination of organic objectives and executive policies that control the business.

2. Preparation of an analysis of organization functions in relation to the objectives.

3. Relating the personnel factor to organization conditions.

4. Suggesting the direction of necessary changes.

The ordinary organization survey, though depending in its detail on the type of business, will in general proceed along the lines suggested above. Although each heading relates to a single objective to be reached before proceeding to the next step, they are nevertheless inter-related, one with the other, and until the whole picture is complete, no definite conclusion concerning the effectiveness of present organization policy can be reached.

The salient feature of this approach is that it separates "functions" from "personnel", though it could be argued, and rightly so, that these two terms are inseparable from a practical point of view. Since the purpose of such an investigation which we shall describe below is to photograph organization conditions as they exist at a given moment, it is necessary to divorce the job from its human performer, describe its functions and its relationships with other jobs, and then treat the job-holder separately both in his relation to his job and in his relation to other jobs and the rest of the organization.

This approach will tend to provide management with the significant facts regarding general organization and their correct relationships, so that loose ends and weaknesses can be isolated and their true nature realized.

1. Examination of Organic Objectives.

The first step in evaluating organization policies is to evaluate the idea behind the business; the motivating force--

the statement of general policy that lends cohesiveness to the entire business. There are four points which must be considered. Each of these four points suggest the technique of proceeding with these phases of the survey.

a. Does a statement of objectives and major policies exist? Obviously, there must first of all be a statement that sets up the major policies of the business. If not, a major and important weakness of organization is already discovered.

b. Is the pronouncement of these major policies clear? Is there a chance that misunderstanding or confusion will result from a hazy statement of the major objective? Does every man in the organization know exactly what the company's position is on every major policy? These and other questions must be answered in examining organic objectives and major policies from the standpoint of clearness. A definite and strict policy unconvincingly stated is as about as useless as a fluctuating and indecisive policy clearly stated.

c. Are these major policies complete? To be effective, the central organic objectives, or the major policies of a business must cover every bit of controversial matter that might arise. They must provide a central purpose against which to check every plan and act. While they need not be specific, they must provide a "constitutional" guide for day-to-day operations and decisions.

d. Are these major policies followed? Herein lies the crux of the whole matter. A clear, complete and authentic pronouncement of organic objectives and major policies will come

to naught unless these basic rules are actually lived up to. The difficulty lies in the fact that actual execution of these basic aims is often in the hands of subordinate officials or employees far down on the organization chart. Proper translation of major objectives in terms of every-day operation is often neglected. If the organization set-up has not resulted in creating the authority for putting these policies into effect, in providing a plan and procedure for operating this machinery, and in setting up effective control to see that employees are following the policy so set down, obviously there is a definite basic weakness that must be corrected before the organization will function as it is meant to function. The technique of determining whether or not major policies are being followed and the steps necessary to insure an adherence to organic policies of an enterprise are suggested in the following second phase of an organization survey designed to evaluate existing policies.

2. Analysis of Organization Functions in Relation to Objectives.

In this phase of the analysis the management research investigator deals only with the job, ignoring for the time being the person or persons responsible for getting the job done. As stated above, the purpose of this particular approach is to bring out to the light the job itself, its importance, its place in respect to other jobs, and the part it plays in the general organization set-up. Here again, the exact technique of

this phase of organization engineering depends upon the type of business, but in general such an investigation would ordinarily proceed along the following lines:

a. First, break down the business into terms of specific functions. This implies a careful and thorough listing and analysis of every function in every department necessary to the proper evaluation of organization principles. Furthermore, this analysis can only be effective if conducted on an impersonal basis. We are not concerned here with the executive or worker fulfilling the function. Rather, we want only to know what functions exist at the moment.

This analysis can be accomplished from two directions. It can proceed from elemental functions upward to executive functions, or it can go from executive functions downward to elemental functions. In general, the latter direction provides a more effective and an easier base from which to operate.

The procedure is essentially as follows:

i. Go through the business, department by department, and set down in each department a statement of the functions for which that department is responsible. In cases of large enterprises it will be necessary to further subdivide each department into logical divisions, so that the analysis might not become too involved, but proceed logically to a complete coverage of all functions. For the time being, logical duplication of existing functions between departments should be disregarded.

Functions must be listed in detail, however. It is not enough, for example, to list as one function the creation of design for a linoleum pattern. The statement of the function should include a breakdown describing it in more detail, i.e., stating the responsibility for development of the new design, the actual creation of the design, and the approval of the design.

ii. List these functions on cards,[1] indicating the department or division responsibility. In general, two factors should be included in a statement of functions: (1) Purpose of the function; (2) Description of the function.

b. After the functions have been segregated and divided the next step is to rate or evaluate the functions. Do they call for superior ability or mediocre ability? What is their general level? The purpose of this step is to evaluate the functions and classify them into high and low levels. Many plans have been suggested for such a job classification.[2] But keeping in mind that this classification is not to be used for wage setting or salary determination, but only to determine approved authoritative levels of all functions in the business, the following self-explanatory classification is generally suitable for this phase of the work.[3]

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(1) 4 x 6 cards generally provide sufficient space for the information.

(2) A good discussion of job classifications can be found in E. O. Griffenhagen's article appearing in the Handbook of Business Administration, pp. 1135-1144.

(3) The writer has found this classification appropriate in classifying jobs of more than 800 student workers under the N.Y.A. program in Boston University. It was first suggested by J. O. Hopwood in an article appearing in the Harvard Business Review, January, 1935, pp. 141.

1. Executive
2. Minor executive
3. Major supervision
4. Minor supervision
5. Highly skilled
6. Skilled
7. Unskilled.

c. Now that the functions have been defined and evaluated, the next step is to show the inter-relations and the divisions of the functions. This is accomplished by an organization function chart in which the functions are related in their proper order and level and not the title of the person responsible for the function, as is the case in ordinary organization charts. When this has been completed and the functions have been lined up and placed in their logical relationships, the management research investigator is ready to proceed to the third major phase of a complete organization survey, that is, relating the personnel factor to the organization functions.

3. Relating Personnel Factor to Organization Conditions.

In this step, the management research investigator is concerned with translating the functions arrived at above into terms of individual responsibilities and duties. The objective of this phase of the problem is not only to determine the personnel carrying out the functions, but the characteristics and suitability of the personnel in relation to their function or functions. In order to effectively accomplish this end it is necessary that such an investigation or analysis be done in terms of names, not titles. Titles are often meaningless and misrepresent conditions as they actually exist. The purpose of the organization survey

can be accomplished only when conditions are set down, first in terms of functions and second in terms of individual responsibilities for performing these functions.

The actual procedure of the first part of this phase is relatively simple. In general, it consists merely of entering the name of the individual responsible for performing the function on the card (1) representing that function. If a person is connected with one or more functions, his name is entered on the cards outlining each of these functions. In the case of functions in the lower levels when many men participate in one function, it might be necessary to code personnel and enter only code numbers in place of names. In other instances, especially in the unskilled levels where personnel is constantly changing, it is sometimes necessary to signify only the number of men performing a specific function. In any event, the net result of this procedure is to definitely ascertain the individual or individuals responsible for every function listed in the organization.

The next step is to compare the personal ability of the individual with the requirements of the function or job. This step is the responsibility of the operating executive immediately concerned. It is not within the scope of the management research investigator. He can only provide the basic facts necessary for such an evaluation.

This examination of individuals in terms of functions

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(1) Cf. pp. 46.

and duties provides the first practical application of the work of the management research investigator in evaluating organization policies. A judicial analysis at this point is an effective means of a thorough personnel overhauling. In this connection, there are four principal points which operating or departmental executives should look for:

a. The actual ability of the individual to perform the required duties. Is the job too big for the employee? Has he got the right amount and right kind of help? Does he need more training? Should he be displaced altogether?

b. The suitability of the individual to the job. Is he a misfit? Is he an expert salesman doing a clerical job? Is he an expert machinist performing simple lathe operations? Is he a sales promotion man performing a sales management function?

c. Is there duplication of effort? Can the work of two individuals be combined into a single job? Are any individuals spending more time with other functions than with their own jobs?

d. Is there overlapping of authority? Is more than one individual directly responsible for a major function? Does any individual have two direct bosses on a single job? Should the lines of authority be re-defined?

4. Suggesting Direction of Necessary Changes.

At this point, management can use the data thus gained to accurately evaluate existing organization policies and determine where changes are necessary. The actual use of this material is suggested as follows:

a. First, to set down functional responsibilities. This implies a bringing together in one place of an analysis of all necessary jobs so that management will know just what is to be done and the general personal level required to get it done. It suggests elimination of unnecessary functions and duplicate functions. It points out the possibility of combining functions, or shifting general responsibility to other executives or departments.

b. Second, to indicate personal responsibilities. As stated previously,(1) a major objective of an organization survey is to re-define individual responsibilities and duties. If the survey should indicate any deviation from personal responsibility or lack of emphasis of specific functional responsibilities on the part of any individual, the material gained in an organization survey of this type will point directly to the specific individual responsible and the functions affected.

c. Third, to remedy loose ends and weaknesses of general organization. More important perhaps than the information and psychological aspects of the application of the findings of the management research investigator in this connection, are the remedial uses to which the information thus gained can be put. Not only will loose ends and weaknesses either in functions or in personnel be apparent, but also because both the functional and personal analyses are available, definite solutions and changes will be immediately suggested.

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(1) Cf. pp. 40.

Section IV.

EVALUATING THE EFFECTIVENESS OF WAGE INCENTIVE PLANS

IMPORTANCE OF PROPER SELECTION OF WAGE INCENTIVE PLANS.

The necessity of effective wage incentive plans cannot be overestimated. A worker's wage is perhaps the most important force generating productive activity. It is not only necessary that the worker be paid for the time spent on the job, but the employee must also be provided with some reasonable incentive that will encourage him to increase his output. In scattered cases, this incentive comes through individual desire or pride in accomplishment, but usually the incentive must be in the form of an increased financial return. This fact suggests a two-fold relationship of the entire problem of wage incentives. On the other hand, the worker's chief aim is to get as large a total wage as he can. This constitutes the prime motivation to increased effort. Management, on the other hand, is concerned directly with lowering costs of production to a minimum. If such reduction can be accomplished by a means of increased output, it is to management's advantage to provide the worker with necessary incentives in pay in order to assure the necessary increase in output.

Another important factor in the selection of wage incentive plans is the wage objective of labor unions. In highly organized industries especially, unions exercise considerable influence in the determination of incentive plans. Although the basic union aim is to "eliminate competition among union workers by substituting for many different rates paid by employers one

single standard rate for each occupation or kind of job", [1] in recent years a number of unions have acted constructively and co-operatively with the management wage incentive program in return for the promise of greater security of employment, larger share in the gains of increased production, and wider control in shop discipline. [2]

Many wage incentive plans have been developed to fit specific needs.[3] Moreover, it is a common occurrence to find several plans of payment in a single shop. Our problem is to determine a method of evaluating a wage incentive plan already in use. Does a particular plan secure the maximum co-operation between the workers and the employers in the reduction of total unit costs? Is some other plan likely to prove more successful? What facts should be obtained and what methods should be used in evaluating various wage incentive plans?

FACTORS TO BE TAKEN INTO CONSIDERATION.

There are a number of factors that must be taken into consideration when attempting to arrive at a basis for evaluating a particular wage incentive plan. For the purpose of convenience these factors are divided into two groups, i.e., tangible cost and production factors; and intangible, human factors.

It should be stressed at this point that each of these factors are equally important. The considerations entering into

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(1) Daugherty, C. R. Labor Problems in American Industry, pp. 536.

(2) Ibid., pp. 705.

(3) See Lytle, C. W., op. cit. for a complete statement of various wage incentive systems.

this analysis cannot always be reduced to a mathematical cost and production basis. The human element is just as important and infinitely more difficult to gauge. It should also be pointed out in passing that incentives are not always of a financial nature. Non-financial incentives are in many cases equally important as financial incentives in increasing production, improving quality, and decreasing cost.(1)

1. Tangible Cost and Production Factors.

The first factors to be taken into consideration are those that directly and tangibly affect the value of a wage incentive plan. Cost and production factors will vary in different situations, but in general they can be grouped under four headings, as follows:

a. Total unit costs. This, of course, is the elemental question in examining any wage incentive plan. How does the plan affect total unit costs? Has it lowered these costs? Has it steadied these costs? What has been the actual result of the plan, including all costs? It is important to emphasize here that the pertinent factor in this connection is total unit cost and not simply unit labor costs. As Mr. K. B. Anderson has put the problem,(2) "Unit Labor Cost is often only a small part of the manufacturing cost. As the worker's response improves, unit labor cost is decreased by use of a straight time wage or gain-sharing plan, remains constant under straight piece work, and increases when multiple piece rates

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(1) For good treatment of non-financial incentives see Cost and Production Handbook, pp. 674.

(2) Anderson, K. B., Handbook of Business Administration, pp. 657.

and step features are used. But the highest level of response comes only when the last type of plan is applied. Consequently, if indirect expense is proportionately high as compared with direct labor due to the use of valuable equipment and heavy items of fixed expense, total unit cost may be lower as a result of spreading the burden over a larger number of units produced in spite of the increased labor cost per unit. In a plant where several large automatic machines are operated by one employee, for example, a step plan may give the lowest total unit cost because it is the strongest incentive and stimulates a maximum number of operators to come up to task."

b. Rate of Output. Closely connected with the above factor but nevertheless important enough to be treated separately is the factor of rate of production. This feature is especially important in wage incentives applicable to workers turning out large numbers of small articles, or to sub-assemblies and packing operations. It is difficult in these instances to analyze the effect of a wage incentive plan in terms of unit costs since the total costs of these operations themselves make up only a fraction of total production costs. Thus it is that actual rate of output is an important factor to be taken into consideration in any evaluation of wage incentive plans. In cases where there is no production unit, other factors must be analyzed in order to measure the effectiveness of a particular plan.(1)

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(1) Cf. pp. 63.

c. Waste and spoilage. This third factor plays an important part not only in the evaluation of a specific wage plan but as an actual fact of the plan. A number of plans are based on both production and reduction of scrap, while in some instances a bonus is based entirely on reduction of scrap output.(1) Regardless of whether or not the cost of waste and spoilage is sufficiently large to bring these factors into the incentive plan itself, the rate of scrap output is an important factor in measuring the effectiveness of a wage incentive plan and as such it is included in the scope of the management research investigator's work.

d. The ease of administration. One of the first essentials of the wage incentive plan as stated by many authors is that it be easy to administer.(2) This is an important tangible factor to be considered in evaluating the general effectiveness of a wage system. It is often a major determining factor in the selection of a wage incentive plan. Commenting on this point in connection with the relative merits of individual plan or a group plan, H. P. Dutton recently said: "A group plan of paying a bonus greatly simplifies and reduces the accounting and clerical operations since only one record of production need be kept for the entire group."(3)

Some increase in overhead comes with the operation of any wage incentive plan. Clerical costs, inspection costs, and costs of the payroll departments always increase; and these increased

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(1) Cost and Production Handbook, pp. 649.

(2) For example, see Cost and Production Handbook, pp. 658.

(3) Dutton, H. P., "The Wage Incentive Plan You Ought to Have", Factory and Industrial Management, Vol. 83, December, 1932, pp. 451.

expenditures or the increased personal attention required of executives should not become so burdensome that they will more than offset savings accruing from the wage system.

2. Intangible Human Factors.

Classified under this heading are a number of factors difficult to measure but nevertheless most important in evaluating wage incentive plans. No plan can be successful that ignores the human element -- the reactions of the worker actually affected by the plan or the conditions under which the system is operated.

Any grouping of these intangible factors is necessarily arbitrary, but the following four principal points cover more or less completely the important human elements that must be taken into consideration in this connection:

a. Fairness to the worker. Is the plan fair to individual employees? Does it provide for the workers a just and reasonable share of the increased value due to accelerated output? Is the reward practical and material for services rendered? Does the plan tend to stress unduly the negative appeal, that is, does it arouse fears of penalities, excessively low wages, or demotion? Likewise, is the plan fair to management? Does an excessive share of savings due to increased output go to the workers? Furthermore, does the plan assist supervision in a practical manner? Answers to these and other questions provide a basis for judging a plan in terms of fairness to all concerned.

b. Ease of understanding. The second intangible human element in any consideration of a wage incentive system has to do

with the ease with which the plan is understood by the workers. Some empirical plans are quite complicated and require a great deal of computation. Others are less involved and can be easily figured by the worker himself. In any event, the plan if it is to be most effective should be simple enough that an employee can reasonably figure his approximate relationship to the group or to individual performance, if not actually possible to compute his own earnings quickly and easily. Furthermore, the results should be made available as rapidly as accurate compilation of rates will allow.

c. Promotion of harmony. The wage incentive plan to be effective must necessarily promote harmony between employees and management. The plan should increase confidence. Any indications to the contrary should be an immediate warning for investigation. Equally important with tangible cost and production factors, a wage incentive plan must aid in team work and automatically assist effective and practical supervision.

d. Element of response. Finally, the management research investigator must take into consideration the fundamental aim or aims of the incentive system. Not all systems are planned to increase output or lower cost directly. One authority states six elements of response to be found in wage incentive system. (1) These are:

1. Lower unit costs
2. Increased output
3. Increased quality
4. Reduction of material waste
5. Accident prevention
6. Regularity of attendance.

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(1) Anderson, K. B., op. cit., pp. 645.

The results of a wage incentive plan must be directly judged by the response for which the plan was designed to obtain. In other words, an evaluation of wage systems must hinge on the objective intended or implied. A wage incentive system cannot very often accomplish results for which it was never designed.

THE TECHNIQUE OF WAGE INCENTIVE RESEARCH

The actual procedure of evaluating wage incentive systems will vary considerably with the specific situation under consideration. The factors to be considered cover so much ground that it is almost impossible to chart any definite course for the management research investigator. The problem facing the investigator varies to a great extent. Sometimes it is necessary to study a plan from a cost and production standpoint and in other instances from a human or intangible standpoint.

Nevertheless, the problem can be broken down into its fundamentals. Generally speaking, the purpose of such an investigation takes either one or the other, or both, of two approaches. First, the investigation is aimed to produce a complete factual evaluation of the plan as it now exists; or second, it is aimed to provide a basis of comparing one incentive plan with another in a given situation with the end in view of determining which plan will give the most beneficial results.

With the above limitations in mind, the technique of wage incentive research can be studied under the following two headings:

1. Mathematical Analyses of Cost and Production Factors.

The management research investigator can determine differences in cost under various wage plans for a specific operation

by calculating total unit charges applicable to each of several systems. This provides a basis from a cost standpoint for determining relative effectiveness of each system. Two precautions, however, must be emphasized. First, the particular job standard must be considered as already improved and fixed. Second, any changes in burden resulting from increased cost in administration of various plans must be shown in the analysis.

Dr. Frank L. Eidmann has provided an excellent example of this technique, illustrating the exact procedure to be followed in making an analysis of this type.(1) The job chosen in this illustration is an operation consisting of machining castings on a milling machine. The material cost for each raw casting is fifty cents and the machine rate is twenty cents per hour except where the cost of increased planning and wage administration raises this item to twenty-five cents an hour. Workers' earnings and unit shop costs per day are computed for different levels of production according to the following methods of wage payment:

a. Day rates
b. Straight piece work
c. Halsey Premium Plan
d. Taylor Differential Piece Rate
e. The Gantt Task and Bonus Plan
f. Emerson Efficiency Bonus Plan.

A comparison of workers' earnings per day under the various wage payment plans and a comparison of shop costs per day is illustrated in the following table:

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(1) Eidmann, Frank L., op. cit., pp. 384. See also Handbook of Business Administration, pp. 648, and Lytle, C. W., op. cit., pp. 40.

Example of Mathematical Analyses of Cost Factors in Comparison of Wage Payment Plans (1)

No. of Castings Produced (Day)	Workers Earning (Day)					
	Day	Straight Piece	Halsey	Taylor	Gantt	Emerson
8	$3.20	$1.60	$3.20	$1.12	$3.20	$3.20
12	3.20	2.40	3.20	1.68	3.20	3.20
16	3.20	3.20	3.20	2.24	3.20	3.296
20	3.20	4.00	3.466	4.00	4.26	3.84
28	3.20	5.60	4.00	5.60	5.97	5.12
36	3.20	7.20	4.53	7.20	7.68	6.40
44	3.20	8.80	5.066	8.80	9.39	7.68
52	3.20	10.40	5.60	10.40	11.09	8.96
	Total Shop Costs (Day)					
8	$8.80	$7.20	$8.80	$7.12	$9.20	$9.20
12	10.80	10.00	10.80	9.68	11.20	11.20
16	12.80	12.80	12.80	12.24	13.20	13.296
20	14.80	15.60	15.066	16.00	16.26	15.84
28	18.80	21.20	19.60	21.60	21.97	21.12
36	22.80	26.80	24.13	27.20	27.68	26.40
44	26.80	32.40	28.666	32.80	33.39	31.68
52	30.80	38.00	33.20	38.40	39.09	36.96

An analysis of this nature will provide one with valuable and pertinent information with regard to relative costs of different types of incentive plans as pertaining to a single operation, but as we have pointed out previously,(2) this is not always a criterion on which to judge the effectiveness of a particular system.

In addition to comparing results of several plans on a single operation, the management research investigator will be called upon to judge the relative effectiveness of wage incentive systems already in operation and where no chance of hypothetical cost comparison exists. This is especially true in places having a number of incentive

(1) Computed from data presented by Professor Frank L. Eidmann, op. cit., pp. 383 ff.
(2) Cf. pp. 52.

plans operating under a wide variety of operating conditions. The problem here can best be attacked by evaluating factors common to all plans. In general, the following four indices or relationships can be utilized:

a. Percentage of Standard Tasks Completed. When it is necessary to evaluate the relative effectiveness of different wage incentive plans used under totally different operating conditions and standards, an important measurement is the percentage of standard tasks completed. This procedure, suggested in a talk by Professor Fairchild Raymond before the American Statistical Association,(1) not only emphasizes the response of the worker to the plan but also gives a good indication of its all-round effectiveness and efficiency. It is possible, of course, that circumstances will alter operations in different departments. If the computations cover a reasonable length of time, the inequalities due to varying conditions will be evened out and the relationships will provide an accurate and valuable measurement.

The technique of this procedure is relatively simple. It consists merely of computing a relationship between actual output and standard output of all workers operating under the incentive plans being considered. The degree of standard task achievement (or failure of achievement) is not ordinarily important although sometimes advisable to take into consideration. The main point is simply to answer the question: "What percentage of standard tasks were completed under this wage incentive system during this reasonable length of time?"

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(1) Hotel Commodore, New York City, December 31, 1935. From notes of the writer.

When the results of such an analysis are placed before management, the relative effect from a production and labor response standpoint of various wage incentive plans can easily be indicated.

b. Index of Unit Costs. Another method of reducing wage incentive systems to a common denominator is by reducing various unit costs to a percentage of a common base and tracing results under various sytems. This procedure, however, is effective only when variable costs entering into the unit cost are discounted and as a result is not as widely applicable as the first method stated of evaluating the relative effectiveness of various wage incentive plans. It is generally useful only with procedures and operations that have become standard, both as to method of manufacture and as to material cost.

c. Cost per Wage Dollar of Administration of Wage Incentive Plans. In addition to the above two procedures, a third tangible method of evaluating relative effectiveness of wage incentive plans, under varying operating conditions, is to determine the cost per total wage dollar applicable to administering the system. If accounting procedure permits a close allocation of administrative costs of various plans, such a comparison can easily be made and will shed considerable light on this important factor contributing to the all-round effectiveness of a wage system.

d. Per Cent Spoilage to Total Amount. Waste and spoilage factors in wage incentive plans can be evaluated generally

by comparing the per cent spoilage to total output under each system. Actual amount of spoiled goods will vary, of course, in various departments because of differences in materials and processes, but deviations over and above normal or standard results can be used to a certain extent to measure the relative effectiveness of various wage systems from a quality standpoint.

e. Determining Indirect Evidences of Effectiveness. Some incentive plans are necessarily based on indirect measures of performance since either no production unit exists that can be counted or the production unit is not suitable for this use. The effectiveness of such plans can best be evaluated by examining the trend in the tangible measurements that are used in determining the employee's wage. For example, a nearby cordage plant has several operators on an incentive plan based on the number of hours the worker's machine is in operation and not on the amount of rope the machine produces. A record of the frequency and extent of machine stops can be set up to provide management with a suitable measurement of the effectiveness of that particular system even though it is not based directly on output. A further example is found in incentive plans for power house engineers and firemen which are based not on actual power production but on efficiency achieved, as measured by steam level chart, quantity of fuel used, or analysis of ash. In such a case, again, the effectiveness of the incentive system can best be determined by studying the actual results achieved.

2. Analyses of Intangible Human Factors.

The problem of evaluating the human element so important to the success of a wage payment plan is a difficult one. Nevertheless, the true situation cannot be revealed unless this is accomplished. Fairness, understandability, harmony, and human response are important factors in any wage system and as such must be taken into account.

The technique of measuring the human element in its connection with a wage incentive plan varies considerably in different businesses. In many instances, it is almost impossible to obtain any definite reactions whatsoever. In such cases, the required information can be approximated or even accurately surveyed by informal discussions and observations. It goes without saying that an individual making such observations should be "close enough to the man at the bench to understand exactly how his mind works and what his attitudes are."(1) If conditions allow, this is often the most effective means of surveying the human element of a wage system.

But should such a method be impossible or inconclusive, the management research investigator should turn to techniques of a more tangible or specific nature. In general, these procedures can be classified into three groups:

a. Direct Analysis of Existing Data. This method is limited, in the main, to large firms using many types of incentive systems under one roof where the information desired is a comparison

(1) Bowers, Glen, op. cit., pp. 1069.

of the effectiveness of each of the several plans. It consists, primarily, of analyzing comments pertaining to wage incentive systems in relation to total comments. For example, if an effective suggestion system is in operation, the workers' personal reactions to different plans can be gauged somewhat by comparing suggestions pertaining to the incentive plan in each department to total suggestions received from that department. If such an index is out of line in certain departments under certain wage systems, it is an indication that all is not well from the workers' attitude standpoint, even though cost and production data might point to reasonable effectiveness of the plan. Likewise, shop committee requests or minutes of meetings, where such committees exist, can be analyzed in the same manner.

b. Specific Attitude Surveys. From a scientific standpoint, a carefully administered survey of employee attitudes is more effective than any other method for evaluating the human element of a wage incentive plan. A practicing psychologist or industrial engineer, if he knows the rules to follow and is experienced in service of this type, will generally furnish management with the exact information required. A recent excellent example of such a survey, though used for a different purpose and directed to a homogeneous group of workers, illustrating the type of information possible to obtain, was recently completed by Dr. Edwin Chamberlin of Boston University and published in Personnel Review, October, 1935. (1)

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(1) Pp. 118. See also Uhrbrock, R. S., A Psychologist Looks at Wage Incentive Methods. Hersey, R. B., Workers' Emotions in Shop and Home. Williams, Whiting, What's in the Worker's Mind.

A more specific problem presents itself when a wage incentive plan aims to directly produce an element of response other than increased output, reduced labor cost, or, indirectly, increased quality.(1) In such cases, the technique of evaluating the plan in terms of this objective is relatively simple. If the aim of a bonus plan, for example, is to reduce material waste, the record of waste can be laid side by side with the operation of the plan and the results can be accurately determined by inspection of the record. If an incentive system is designed primarily to increase attendance regularity, a record of absences and tardiness can be examined to see if expected results are being achieved.

c. Controlled Experiment. Sometimes it is possible, where conditions permit, to undertake a laboratory program to demonstrate under controlled conditions the relative effectiveness of various wage systems. No record of such an experiment exists although it has been recently suggested by Dr. Uhrbrock.(2) He proposed a one-year research experiment in a department where production and earnings have leveled off to demonstrate actual results of various wage systems. Such factors as variations in output, in quality of work, in degree of effort expended, and in attitudes of workers and supervisors under various systems, he said, can be accurately measured by means of a program of this nature.

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(1) Cf., pp. 57.

(2) Uhrbrock, R. S., op. cit., pp. 27.

Section V.

EVALUATING PERSONNEL PROGRAMS

Personnel administration provides a fertile field for the management research investigator. It is one phase of the general management picture about which executives are seeking more and more information. Especially in times like the present, when costs and expenses of all kinds are carefully reviewed, it is necessary that some true evaluation of existing personnel policies be undertaken. The technique of going about such an investigation, the procedures to be used, and the methods to be employed call for a wide range of activity. For this reason, a discussion of techniques employed in evaluating personnel programs is valuable not only for the immediate purpose of determining the worth of specific features but also because of the adaptability of such procedures to other management problems.

NATURE AND HISTORY OF PERSONNEL PROGRAMS

Before beginning the discussion of techniques to be employed, it is necessary to make one or two observations regarding personnel programs and policies in general. In some respects they differ fundamentally from other management problems we have been dealing with in this paper. It is necessary that the management research investigator have the following points firmly in mind, if his study is to be of maximum usefulness.

In the first place, personnel programs grow; they

are not selected. Management does not look over valuable features in programs when desiring to expand or add to personnel programs and pick this feature or that feature and put it into effect. Rather, are personnel programs a result of gradual evolution. Plans, procedures and activities making up the program are introduced, expanded, modified, or discontinued, as conditions require.

As a result, the management research investigator is not used as much during the inception of a plan, or a particular feature, as he is used to evaluate the tangible results of such a plan or feature after it has been introduced. At this point is the management research investigator brought into the picture to determine whether or not there is a definite need for a particular plan or feature of the personnel program under consideration.

The second point regarding personnel programs, concerning which the management research investigator should be familiar, is that the extensive personnel programs of today are a relatively new development. Consequently, there is no great body of experience to draw upon in determining the organization and make-up of a personnel program. This development has been especially rapid since the World War. The National Industrial Conference Board has recently issued an excellent survey of the factors contributing to the rapid development of modern personnel administration during the past few years. Summarized, these factors are listed below, as follows:[1]

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[1] National Industrial Conference Board. "Industrial Relations: Administration of Policies and Programs." pp. 8 ff.

1. Changes in Industrial Organization.

Since the beginning of the 20th century not only have individual manufacturing units greatly increased in size but owners have given place to officials in the current management of these enterprises. As a result of this factor, it has become necessary for employers to delegate to others the task of maintaining close contact with workers and contributing to their morale.

2. Effect of the World War.

The War was an important stimulus to the development of personnel activities and programs in that it provided conditions that made possible experimental work in this field. At the same time it revealed the weaknesses of theories and methods of administration of programs of that time, thus paving the way for somewhat slower but sounder progress in later years.

3. The Modern Necessity of Uninterrupted Production.

One of the most certain ways of preventing the economic waste of interrupted production due to labor controversies, accidents, sickness or irregularities is to build up within a plant a reputation for fair dealing and the consideration of the interests of employees. This factor has contributed much to the development of personnel programs.

4. Competition for Desirable Labor.

Effective operation of a manufacturing plant today calls not only for a definite number of employees but for a supply of workers possessing characteristics of reliance, loyalty, energy, and desire to excell. Although the prospect of high wages is

perhaps the most important single feature that attracts good workmen to a plant, the general treatment of the workers or the interest shown by management to the workers is an important factor. High wages are by no means the complete answer to personnel problems.

5. Building Good-Will on the Part of the Public.

A plant is necessarily affected by the attitude of the community in which it is situated. An effective personnel program is an important factor heightening the reputation of a plant in its own locality. A large part of the recent growth and consolidation of personnel programs can be traced to a recognition of this necessity.

6. Contact with Labor Unionism.

It cannot be denied that most employers view with alarm the expansion of labor union membership within their working force. Obviously, employers in recent times have attempted to provide their workers with conditions more attractive than the workers could hope to secure through a labor organization. This has, of course, resulted in an expansion of personnel programs.

Though the principal factors making up the reason for personnel programs are listed above, over and over these separate indications or trends is a general recognition of the interdependence of the various elements in our industrial structure. The world has been knit together more closely

with the resulting growth of social consciousness and social responsibility. In the last analysis, the development of personnel programs is the resultant of many forces, direct and indirect, mental and material.

But there is still a third peculiarity of this general problem of personnel programs that the management research investigator should keep in mind. Changes and revisions are constantly taking place within programs and specific features of personnel activities. One authority has stated this factor as follows: "The forces that shape and determine characteristics of these programs are always changing, and these call for changes in policies and methods."(1)

Individual companies, in determining the relative effect or worth of specific plans or component parts of the personnel set-up must always take into account changes in their own particular situation. Sometimes these changes are internal, sometimes external, and sometimes both. They include questions of income, location, expansion, competition, community development, and numerous other factors.

Finally, the oft-repeated qualification of management research is particularly effective here. As one authority puts it: "Personnel policies can never be decided solely on the basis of verifiable objective data. A few facts plus a liberal amount of opinion and interpretation constitute the basis for attempts at evaluation."(2)

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(1) Stone, R. W. "Personnel Management: An Appraisal." Factory and Industrial Management, June 1932. pp. 276.

(2) Uhrbrook, R.S. "Getting Facts for Administering Personnel Policies." Personnel, August, 1935, pp. 131.

IMPORTANCE OF EVALUATING PERSONNEL PROGRAMS

Continued appraisals of personnel programs are necessary for many reasons. Many considerations necessarily enter into the picture in determining personnel policies, and, accordingly, periodic evaluation of plans and features is of prime importance. During the present time, perhaps more than during any other period, is management subjecting personnel programs to thorough investigation in order to determine their actual and going value.

The principal reasons why such appraisal is warranted might be summarized as follows:

1. To determine monetary return from money spent.

Evaluation is necessary because of the cost of personnel programs. In many instances annual expense runs from $13 to $67 per employee.(1) Naturally, management demands some tangible evidence of value received for this substantial consideration. Personnel programs are not conducted on benevolent principles, but only when they show definite results.

2. To clarify personnel objectives.

Periodic evaluation is necessary, in the second place, in order that plans and features might be examined in terms of the organic objectives of the entire personnel program. In the development of these complex programs it is quite easy sometimes to give disproportionate emphasis to one particular phase of the work. For example, a recent writer has complained of the over-emphasis of striving for community good-will.(2)

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(1) Balderston, C. C., Executive Guidance of Industrial Relations, pp. 376.

(2) Stone, R. W., op. cit., pp. 279.

He goes so far as to say that this development has unfortunately proceeded to such an extent that good-will has been made a direct goal of a number of personnel programs rather than a by-product of more important objectives.

3. To actually measure results.

A third reason for evaluating industrial relations programs is that specific and tangible evidences of results can be obtained. As we shall see later,(1) such evaluation provides a definite check list or measuring stick against which to evaluate general results.

4. To insure effective utilization of human resources.

Only a continued reopening of the question will definitely guarantee to management that their efforts are constantly directed toward the most effective utilization of the human resources available. The importance of this factor has been stated before,(2) because it constitutes perhaps the most important single consideration basic to personnel programs.

5. To avoid dangers of half-way measures.

Sometimes a firm would be better off without a particular personnel feature simply because it does not go far enough. Periodic evaluation will often expose this factor and point the way to remedies.

6. To keep in step with needs.

Finally, continued or periodic appraisals of personnel programs uncover changes in particular situations that alter the objectives of the general policy. It might be that a

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(1) Cf., pp. 75.
(2) Cf., pp. 6.

particular feature is no longer of value. On the other hand, there might possibly be a definite new need for another personnel feature. In any event, an evaluation of a current personnel program is very likely to point out these changes and the policies that are necessary to keep in step.

TECHNIQUE OF EVALUATING PERSONNEL PROGRAMS

The technique of evaluating particular features of personnel programs has been fairly well worked out in recent years as a result of the increased demand for specific facts to be used as a basis for administering personnel policies. It is necessary, however, to bring into focus in terms of a definite research program all of these various procedures so that some common technique can be stated which will cover all possible situations.

Dr. Uhrbrook's warning,[1] however, should be stated again. Mere tangible facts dealing with evaluation of personnel programs cannot be used as the sole basis for management decisions concerning a personnel policy. There has never yet been developed a substitute for careful judgment.

But the importance of accurate collection and careful analysis of such facts must not be minimized. They are valuable and often shed light on particular features that have been obscured in the general run of things. So it is necessary and quite important that a definite and scientific research program should be considered in evaluating personnel programs in order that pertinent facts can be collected which will serve as a guide for later decisions.

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(1) Cf., pp. 71.

As in other programs of management research, (1) the management research investigator must necessarily approach this problem from two angles: First, he must determine a method of measuring and evaluating tangible evidences of effectiveness; and, second, he must determine and appraise intangible evidences of effectiveness. Suggested techniques and procedures for each of these two approaches are discussed separately in the paragraphs immediately following.

1. Tangible Measures of Effectiveness.

In many instances it is possible to obtain specific or factual information regarding the worth of particular features of personnel programs. While it is not always true that specific facts are wholely influenced by a particular personnel plan, nevertheless they do constitute definite measuring rods which can honestly be used to measure progress.

Ten of the most important techniques or procedures are discussed below in order.

a. Character of applicants for positions. This information is readily obtainable either from the application records of individuals desiring to enter the employ of a particular company or from the records of workers recently employed. If the general character of applicants seems to be high it is a good test that the company has, in general, established a reputation for fair dealing and has the interest of its workers at heart. While this test cannot be used to evaluate any specific personnel policy, it does indicate a general over-all effectiveness of the personnel programs that have been adopted.

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(1) Cf., pp. 58.

A further proof in this connection would be an examination of employment records to determine how many sons and daughters of other employees are employed or are on the waiting list. If a father likes a firm well enough to want his son or daughter to work there also, it is a fairly good indication, when substantiated by other factors, that the personnel program of that particular plant is generally effective.

b. Labor turnover, tardiness and absenteeism. Under this heading are grouped a number of tangible factors that can be employed by the management research investigator in evaluating personnel problems. Turnover and attendance records are collected by nearly all plants and can be adapted to this specific purpose without much extra effort. In a recent study of personnel activities at the Cheney Brothers plant in South Manchester, Connecticut, data was presented to show a reduction in labor turnover from 57.8% to 25.0% in the short space of ten years, largely attributed to improved industrial relations activities.(1)

Likewise, tardiness and absenteeism data can be used in the same manner. Furthermore, the record of transfers and shifts within different departments of a company is valuable as a source of information to be used in evaluating personnel activities.

c. Length of service. A third tangible measurement closely related to labor turnover, but nevertheless important in itself, is a study of length of service records of individual employees in a plant. While this particular factor might be more

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(1) National Industrial Conference Board. Industrial Relations Activities at Cheney Brothers. pp.5.

dependent on other considerations than on personnel activities, it is nevertheless an important index of general all-round effectiveness. A man is more likely to pile up a record of long service in a firm generally recognized for fair dealing and objective interest than in a firm where personnel programs and policies are not as generally effective.

d. Waste percentage, quality of work. Waste and delay records, including both time and material, can often be used as a general index to evaluate personnel programs of a specific concern. Material waste percentage records can be analyzed side by side with personnel program development, furnishing another yardstick against which to measure relative effectiveness. A properly administered personnel program not only should decrease waste and scrap but should increase and tone up general quality of the entire output. A satisfied worker engaged with management in a common interest cannot help but be concerned with improving the quality of his work. For this reason the effectiveness of personnel activities can be judged in the light of improved quality and declining waste percentage. In this connection the management research investigator can also examine the entire production picture to see if any other criteria can be gained to judge personnel programs. The investigator can examine schedule performance to ascertain whether or not there was improvement in meeting schedules and getting work out on time. Likewise, he can examine actual cost records to see if economies were being consolidated.

e. Lost time sickness records. Lost time sickness records provide another valuable factual basis for evaluating personnel activities. Such records are common to most firms and are readily

adaptable to analysis of this nature. Better health and less "soldiering" are tangible evidences of certain phases of personnel programs. Especially are they indicative of the success of medical and health features. One textile manufacturer stated this idea as follows: "Medical supervision pays for itself by the part it plays in proper placement initially and by reducing absenteeism for minor injuries and ailments through professional treatment of the afflicted."(1) By using sickness and health records of employees, the management research investigator can generally determine the exact results of health and medical features of a personnel program.

f. Accident rate. Another technique or method of investigation at the disposal of the management research investigator in evaluating personnel activities is an examination of the accident rate of a firm to determine if results justify a general personnel program or a specific safety education feature of a plan. There are two factors which should be taken into consideration in this connection. In the first place, the number or frequency of accidents should be determined, and, secondly, the severity of accidents should be considered.

Plant records normally provide this information in a quickly accessible and usable form. An example of the results to be obtained from an investigation of this nature is contained in the appraisal of personnel activities at the Cheney Brothers plant. In this instance, the accident frequency rate was reduced from an index of 12.2 accidents per one million man hours to 7.1

(1) National Industrial Conference Board. "Industrial Relations Policies and Programs, pp. 94.

accidents. During the same four-year period used to compute the foregoing, compensation paid out for accidents declined from $13,000 to $3,300.(1) In another instance, the president of a firm reported that a substantial accident reduction was due in a great measure to an admirably administered safety program which was a part of that firm's general personnel set-up.(2)

g. Advances on wages and attachments. The financial position of employees is an important factor to consider when gauging the all-round effectiveness of a personnel program or a specific feature having to do with employee thrift or savings. One of the best indications of this general condition can be obtained by an examination of advances on employees' wages, or of wage attachments. If the thrift feature of a personnel program is successful, such examination should show a steady decline of these two factors over a period of years. Likewise, a management research investigator can use other procedures in achieving a tangible evaluation of this particular feature. Such factors as home ownership, savings accounts, insurance, participation in annuity plans and Christmas Clubs can all be measured and offered as tangible evidences when appraising or evaluating personnel activities.

h. Employee support of activities. Perhaps no better indication of the worth of personnel activities can be gained than by actually measuring employee participation in the various features and activities which make up the personnel program.

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(1) National Industrial Conference Board. Industrial Relations Activities at Cheney Brothers, pp. 27.

(2) _____ Industrial Relations: Policies and Programs, pp. 93.

For example, a management research investigator can actually count the number of persons using the plant lunchroom or clubroom. A falling off of attendance, of course, is prima facie evidence that the value of these features has diminished or that their operation needs improvement. Participation in other activities can likewise be measured. Attendance at social gatherings and classes, participation in savings and insurance plans, patronage of company stores, and attendance at annual picnics can be used effectively as a basis for evaluating personnel programs.

One writer says that so long as specific features are purely voluntary, general participation seems to indicate that they are meeting a need.(1)

i. Labor difficulties and grievances. Still another definite measure of the general over-all effect of personnel activities is the record of the company regarding labor differences and grievances. An effective personnel program usually results in contented employees. Many instances of success in fighting strikes can be definitely traced to effective personnel policies. As a result, the management research investigator has in the labor record of a firm an excellent criteria to be used in judging the success of personnel programs. In this connection it is well to examine and include all labor grievances regardless of whether or not an open break resulted. Friction in departments not great enough to result in an open break, has nevertheless the same effect as far as employee attitudes and output are concerned.

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(1) Ibid., pp. 94.

j. The rate of production. There is a danger, of course, in using changes in output as an index of personnel policy effectiveness, when such change is probably due to many other important factors. But it has been demonstrated that employers actually consider increased production to be largely a result of effective industrial relations activities.(1) Various specific tendencies of personnel activities naturally affect this factor of increased output, but probably the greatest advantage of effective personnel programs that result in increased output is the spirit of co-operation between employer and employee thus engendered.

2. Intangible Measures of Effectiveness.

In addition to concrete and tangible factors forming a technique of management research in personnel programs, there are a number of intangible factors which must be judged and evaluated as well. Keeping in mind that the status of a personnel program cannot be evaluated entirely on the basis of facts tending to measure results, it is important that the management research investigator be prepared to accurately evaluate intangible factors that contribute to the general determination of all-round effectiveness of a personnel program. Therefore, in the following paragraphs definite techniques and procedures are suggested for collecting and analyzing factual information on three principal intangible factors that carry a great deal of weight in the appraisal of personnel programs.

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(1) Ibid., pp. 38.

a. Morale of Workers. Perhaps more important than any other intangible factor determining the worth of a personnel program is the effect of the various activities on the general morale of the workers. Of course, this factor is a by-product of tangible evidences of success already discussed.(1) Nevertheless, it is sometimes important and necessary that such information be determined directly. The method used to obtain this information generally takes the form of a systematic study of employee attitudes. An admirable discussion of attitude measurement techniques was recently given by Dr. A. W. Kornhauser.(2) Summarized, his proposals are as follows:

1. The "Impressionistic" Method. It arrives at its interpretations on the basis of a thousand incidental observations of what men say, how they say it, what they do not say, how they look, how they work, and how they play. Subjective and informal. The method is not "scientific."

2. The Unguided Interview. Used extensively by psychoanalysts. The interviewer asks no questions and does no guiding beyond encouraging the employee to continue with whatever is on his mind.

3. The Guided Interview. All degrees of guidance are possible. Full notes are kept of all questions asked. Kimberly-Clark Corporation compiled a list of fifty questions to serve as aids or reminders to the interviewer of what to look for. Further references: "Houser's investigation in Publicity Utility Companies," and B. G. Moore's

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(1) Cf., pp. 75 ff.

(2) Kornhauser, A. W., "The Technique of Measuring Employee Attitudes" Personnel, May, 1933. pp. 99-110.

study of a group of textile workers toward an employment guarantee plan.

4. Question Blanks. Usually simple questions which can be answered yes or no. The questionnaires are given to groups of workers, with oral explanations, and are answered and returned at the time. Example: A list of job characteristics which the employee indicates his likes or dislikes for. Work of J. David Houser and his associates.

5. Scales for the Measuring of Particular Attitudes. A scale is constructed for attitudes toward one specified object -- say, attitude toward the job. The scale consists of a number of statements of opinion -- twenty or thirty -- extremely favorable to the opposite. In measuring attitudes a person is merely asked to check the statements with which he agrees. From these responses a rating or score is readily computed which shows how fully the person stands for or against the matter in question. Separate scales are required for each attitude and this makes the system expensive.

An outstanding example of a definite, organized program of determining employee attitudes is found in the investigation recently conducted by the Western Electric Company in its Hawthorne Works.(1)

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(1) See Roethlisberger, F. J., and Dickson, W. J., Management and the Worker

b. Attitude of Community. A second important intangible factor that must be measured is the attitude of the community in which the plant is located. What do the citizens of the village, town or city think of the firm? Of course, such attitudes are often determined by other matters than personnel programs, but the fact remains that word of a satisfied and contented working force -- largely the result of far-sighted personnel programs -- travels fast and far, and as a result provides a measurement of effectiveness of these activities.

An excellent description of a technique of measuring community and customer attitudes was recently described by Mr. R. S. Soule, Personnel Director of a large utility company, before an American Management Association Conference on Personnel and Industrial Relations.(1) In his talk Mr. Soule recommended that a firm desirous of making such a survey employ an outside agency. He suggested written, telephone, and personal contacts, preferably by women investigators. The questions asked should be general and should deal only with the personal attitude of the person being contacted.

c. Reputation of Firm. The management research investigator can approximate the firm's general reputation in the industry as another technique or procedure to be used in evaluating effectiveness of general personnel activities. Information on this point cannot be gathered by any formal process, but can only come by means of indirect contact with salesmen and other persons attached to neighboring firms. Likewise, meetings of professional,

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(1) See Soule, R. S., "What Special Provisions Must be Made to Insure Accuracy During the Data-Gathering and Analyzing Processes." Personnel. August, 1935. pp. 146-149.

trade, or industrial bodies bring individuals from many houses to one place, and usually some idea of the reputation of a particular firm can be obtained through informal discussions and conversations which take place at such gatherings. In any event, a firm's reputation in business circles, especially regarding treatment of employees, is an important factor to take into consideration when judging the effectiveness of a personnel program.

A final word of warning to the management research investigator regarding the use of facts in evaluating personnel programs is in order at this point. Facts in themselves, no matter how carefully collected and analyzed, will seldom convince an executive that what they purport to show is true. Indeed, the presentation of available facts dealing with the measurement of the effectiveness of personnel policies requires a technique all in itself. The proper approach has been very well stated by the Personnel Director of the Kroger Grocery and Baking Company. He says in part: "The presentation of facts regarding Personnel Policies requires salesmanship of the most difficult kind, because it involves selling ideas; selling ideas, which in most instances run counter to tradition, established practices, and current thinking."(1)

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(1) Mooney, Paul. "How Should Facts Regarding Personnel Policies be Presented to Executives to Aid in Reaching Decisions." Personnel, August, 1935. pp. 141.

Section VI

EVALUATING EFFECTIVENESS OF TRAINING PROGRAMS

Industry has for many years recognized the importance of organized employee training. Training programs have long played an important part in the development of an effective working force. From an historical viewpoint, training programs point back to the time of the Guilds and the relationship of the master craftsman and apprentice. (1) With the coming of the Industrial Revolution and the introduction of the factory system, the relationship of the master and the worker changed considerably. This brought a number of new developments and new concepts into the field of employee training. Corporation schools sprang up all over the country, to be followed by the expansion of public school training for industry and, finally, by the recognition that training was the responsibility of the individual enterprise to be supplemented by outside agencies when conditions permit.

In recent years other developments have taken place. These have been summarized as follows by Messrs. Scott, Clothier, and Mathewson.(2)

1. Methods of Instruction Have Been Vitalized. A new importance has been given to training procedures and to demonstrated educational principles in the actual task of instruction.

2. Separate Training Departments Have Been Organized Especially in enterprises dealing directly with the public. Although

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(1) From Donald, W. J., "Origin of Training," Handbook of Business Administration, pp. 1242.

(2) Scott, W. D., Clothier, R. C., Mathewson, S. B., Personnel Management, pp. 26.

training is still considered part and parcel of general industrial relations programs, it differs sufficiently from normal personnel activities as to require the services of a decentralized department.

3. Advanced Training Courses Have Been Made Available. No longer is management satisfied only with training for a particular job. The development of future executives is becoming an important policy of many firms, all of which requires training programs of an advanced nature.

4. Management No Longer Insists Upon a Close Cause and Effect Relationship between a worker's training and the job which he is fulfilling. In fact, more and more attention is being paid to training in subjects and fields not directly related to the task of the worker. Especially is this true of workers' education in general economic principles designed to create straight thinking in economic and governmental matters.

IMPORTANCE OF EFFECTIVE EMPLOYEE TRAINING PROGRAMS.

Effective employee training programs are important for many reasons. Fundamentally, of course, there is the problem of individual differences in capacities and interests. Furthermore, individuals themselves are always changing as are the jobs and duties of these workers. This fundamental problem has been stated as follows:

"Every worker presents to management an individual personnel problem because workers in shop or office differ in the things they are fitted to do and are capable of doing. Furthermore, they differ in their interests, aims, hopes and fears. The necessity for

recognizing these important differences leads naturally and inevitably to a careful consideration of education and training as a balance-wheel in helping to bring about more harmonious adjustments between the individual worker and his work and to increase the effectiveness of the worker-in-his-work unit."(1)

More recently an added importance has been given to employee training, especially apprentice training. Industry today is faced with a labor shortage of skilled workers in many trades.(2) Though there is a general over-supply of labor, there is an actual shortage of workers who are skilled in many particular lines, especially machine tool workers, machinists, and pattern makers. Workers who had experience in these lines have in the past few years either made new connections or have outlived their usefulness. Young people who would normally take the place of these skilled workers have been unable to find opportunities for work and consequently have had no systematic training for any skilled trade or line of activity. Furthermore, many of them have despaired of present conditions and have lapsed into that state of instability which is the result of enforced idleness and uncertainty of purpose.

Eventually, industry must face the fact that before many years these same young men must fill the skilled jobs now being held by their elders. This demands a continuous effort of replenishing older workers long active in their trades with young men who must be trained for their new place in the industrial world.

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(1) Scott, W. D. et al., op. cit., pp. 331

(2) Dutton, H. P., "Employee Training," Factory Management and Maintenance, February, 1936, pp. S-182.

The present large size of individual industrial enterprises is another factor contributing to the importance of training programs. Obviously, large plants require more supervision and more workers than small plants. Training problems are naturally affected. Furthermore, specific enterprises have individualities of their own. It has become exceedingly difficult to draw on the general labor reservoir for individuals who will quickly adjust themselves to the operating practices of a particular firm. Unemployment has taken its toll on morale and ability to readjust working methods. As a result, each firm is compelled to take on the added responsibility of training new men.

Another recent development that contributes to the importance of training programs is the continued rapid mechanization of industry. Labor-saving machinery is being used more and more. The recent Machine Tool Builders Convention in Cleveland demonstrated this point beyond doubt.(1) Due principally to a continued high level of labor wages together with an abundance of cheap capital, this increased mechanization has brought new training responsibilities not only as regards new men but to older employees as well.

Another very definite consideration that adds to the increased importance of present-day need for employee training was recently advanced by H. P. Dutton, who brought out the point that industry must take some share in building up the morale of the working class recently shattered by prolonged unemployment.(2) Pointing

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(1) For a description of this Convention, termed the "greatest industrial exhibition ever held in the world," see Steel, September 23, 1935, pp. 27 f.

(2) Dutton, H. P., "Employee Training," op. cit., pp. S-183.

to a definite relationship between skill and morale, Mr. Dutton went on to say that organized training, because it recreates skill and pride of workmanship, can accomplish much in the direction of building up once again the important factors of confidence and security in the lives of many men.

Aside from these general observations regarding the increased importance of effective training in industry, there are more specific evidences of this trend that can be cited in concrete terms as regards their effect on individual enterprises. These have been grouped under four headings as follows:

1. Increased Cost of Training Programs.

It goes without saying that training costs have greatly increased in recent years. Not only has the mechanical development of industry resulted in a greater need for training of a definite nature, but separate training organizations and a continued need of steady production have all combined to raise over-all expenses of training employees. The increasing need of training new people generally of an unsatisfactory background has served to increase the complexity of training procedures and thus to increase training costs. Moreover, the recent trend in the expansion of training programs to include education on higher or unrelated subject fields adds still further to the expense. Thus it is that the very cost of training employees is a factor requiring in itself need for effective and well-directed programs.

Actual costs of employee training vary, of course, with the nature of the job for which the training is being done. Estimates

are available, however, of the expense of training for specific jobs in particular plants. Messrs. Baridon and Loomis, of the Western Electric Company, cite an example of the cost of training one employee for a simple piece-work machine operation. Even after deducting the value of the final product from total cost, they arrive at a training expenditure of $133.65 that was incurred before the new operator began to earn what he was paid.(1)

In connection with evaluating training programs, the management research investigator will necessarily be required to determine actual training costs for specific jobs. The technique of this particular computation has been suggested by Messrs. Baridon and Loomis, who list the essential steps in estimating training costs as follows: (2)

> "a. An analysis of the output records.
> b. A comparison of this production with that of experienced operators, to determine the point at which the employee begins to earn what he is paid.
> c. A proportionate share of the instruction and extra supervisory cost, extra overhead, extra breakage or spoilage."

2. Cost of Labor Turnover.

Another important factor that emphasizes the fact that training programs must be effective is the actual cost of labor turnover. Effective training programs reduce labor turnover and in so doing result in definite savings. Turnover is costly and a training program to be effective must provide every means of reducing this cost. These costs, of course, vary considerably in different

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(1) Baridon, F. E., Loomis, E. H., Personnel Problems, pp. 167.
(2) Ibid., pp. 166.

plants, depending upon the difficulty of replacing a particular worker. The U. S. Bureau of Labor Statistics several years ago presented labor turnover costs varying from $11.50 for each unskilled worker to an average of $85 for semi-skilled piece workers.(1) Messrs. Baridon and Loomis cite an example where the estimated cost of labor turnover for the hourly rated employees of a single plant of a boiler manufacturing company amounts to $95.47 per employee. (2) The same authors present a method of determining complete cost of turnover, listing as factors composing turnover costs the following items: (3)

"a. Cost of hiring per new employee.
b. Cost of training per new employee.
c. Cost of underproduction per new employee.
d. Extra operating losses per new employee.
e. Cost of materials spoiled per new employee.
f. Cost of excessive accidents per new employee.
g. Cost of idle machinery and equipment per new employee.
h. Cost of using machinery and equipment at reduced efficiency per new employee.
i. Cost of business losses due to mistakes of inexperienced employees."

3. The Increased Value of Tools and Machinery Used by Employees.

A third important factor having to do with the recent added emphasis on effectiveness of training programs is the increased value of tools and equipment used by employees. Because of the increased mechanization of industry, equipment inventory per worker has steadily increased. Obviously, greater demands are made on

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(1) Alexander, M. W., "Cost of Labor Turnover," U.S. Bureau of Labor Statistics Bulletin, No. 227, pp. 13.
(2) Baridon, F. E., Loomis, E. H., op. cit., pp. 417.
(3) Ibid., pp. 423.

training programs when each employee is trusted with the care and operation of equipment valued at a substantial amount. In order to protect this investment the training program must be of the right sort. Any old kind of instruction is not enough. Rather must it be definitely designed for the needs of the particular task and be under some sort of specific control.

4. Key Men and Their Development.

The importance of foremen and other supervisors as links between management and workers is being recognized to a greater degree. Consequently, the development of key men is taking a larger place in general training programs. Because of the absolute necessity of training foremen for proper interpretation of company ideas and policies, greater and greater are becoming the demands on training programs of this sort. To secure the whole worth of a company's working force at all times, it is essential that foremen maintain the proper balance between the workers and management. The worker on the job looks to the foreman as 'management personified' and a worker's mental attitude toward his job is largely determined by the attitude of the foreman. Moreover, the foreman contributes largely to a worker's effectiveness and thus to cost and production. Because of this added importance, training programs in plants, especially those programs relating to foreman training, have taken on a new significance and importance.

IMPORTANCE OF MANAGEMENT RESEARCH TO TRAINING PROGRAMS.

Before taking up the technique of determining training needs and the methods of evaluating the effectiveness of training

programs, mention should be made of the reasons why management should want to measure or evaluate such needs and programs. Some of the reasons have been mentioned above but, more specifically, periodic evaluation of training programs is valuable because of the use to which management can put the results of such investigations. In brief, the net results of such studies evaluating training needs and the effectiveness of training programs can be stated essentially as follows:

1. Determining Attainment of Objectives.

Obviously, the first use to which such an evaluation can be put is to measure the actual attainment of the objectives set up for the training program. This information is not only valuable in itself, in that it provides management with tangible results, but it aids in securing the co-operative support of foremen and workers. If these groups can see definite results of training programs put down in black and white, there is no doubt but that the training program will receive more hearty co-operation from them.

2. Improving Training Methods.

A second important product of a research program designed to evaluate training programs is the aid which such evaluation gives to a refinement or improvement of training programs and procedures. If results are not what should be expected, improvements are instituted where necessary and the entire program placed on a higher level.

3. Controlling Training Programs.

Periodic evaluation of training programs has a definite value in that it provides, furthermore, a basis of control of such activities. If results can be measured both quantitatively and qualitatively in frequent intervals, management is provided with a definite control tool that in itself aids in the attainment of training objectives.

4. Justifying Training Costs.

In this day, when costs of all kinds are subject to the closest scrutiny, unsound economies in training programs sometimes prove costly in the long run. If specific and tangible evidences of the worth of training programs are available, it is often easy to prove the economic value of training activities and thus justify expense of this type. Likewise, an evaluation will reveal unnecessary training which might be omitted or improved -- training that does not pay for itself. Only by a specific study designed to determine training effectiveness can an accurate measurement of these factors be gained.

THE TECHNIQUE OF DETERMINING TRAINING NEEDS.

The first essential of the technique of evaluating the effectiveness of training programs is to know the specific objectives of the training course. In other words, the management research investigator must first of all answer the question: "What should the employee get out of the training program?" Putting this thought in a different way--before the attainment of the training

objectives can be measured, the objective itself must first be determined. Naturally, there would be no basis for evaluation or measurement unless the goal or the standard was carefully defined.

As a result, before specific techniques of determining objective measurements of training results can be discussed, it is necessary to state a procedure or method of setting up training objectives. This involves the question of determining training needs. By this means it is possible to determine specifically what each employee should obtain from his training course and to set up specific objectives of the training program.

The procedure to be used in determining training objectives will necessarily differ among industries and among specific departments of individual enterprises. In general, however, it is necessary to make some sort of a survey designed to determine particular training needs of an establishment. Mr. P. E. Wakefield has suggested the following steps to be followed in making such a survey.(1)

> "1. Determine classified occupations in the company's organization.
> 2. Determine the number of men employed in these occupations.
> 3. Determine what the duties of these occupations are.
> 4. Determine what special knowledge or training is required for each of these occupations."

Given information from a survey along the above lines, Mr. Wakefield goes on to say that management can then determine specific objectives and arrange effective training programs for particular groups.

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(1) Wakefield, P.E., from Proceedings of Annual Conference, Pennsylvania State Department of Labor and Industry, 1921, pp. 136.

Another effective procedure of accomplishing this result has been stated by Mr. J. H. Greene.(1) He outlines the technique of obtaining data from four principal sources of information which bear on this problem. Summarized, his suggested survey technique for determining objectives is as follows:

1. Determine Needs from Records of Employment Office.

A careful examination of employment office records will reveal at least two items of information which will aid in determining training needs. First, these records should indicate which jobs are most difficult to fill for lack of trained employees. This fact gives a definite direction to the problem of determining where training is necessary and the proper objectives of such training. Second, these records should reveal what jobs are most frequently vacated, either because of dissatisfaction on the part of the worker himself or on the part of the foreman or immediate supervisor. Here again is another definite indication of a need for training, suggesting at the same time the objectives which specific training on those jobs should achieve.

The management research investigator can carry this line of action still further by visiting the departments where the employment records indicate lack of proper training, determining for himself what training is being given and whether or not proper objectives have been set up.

2. Conferenceswith Executives or Foremen.

A second method of determining training needs and

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(1) Greene, J. H., Organized Training in Business, pp. 53ff.

objectives as set down by Mr. Greene is to obtain from informal conversations with executives and supervisors known to be interested in workers and their problems information as to what they believe to be the principal weaknesses and shortcomings as regards the proper training of particular workers. The management research investigator can generally obtain from these sources a fairly complete and authoritative concept of what should be the specific training objectives for a particular department or job.

3. Informal Talks with Workers.

The management research investigator can sometimes be aided in his evaluation of training objectives by getting the workers themselves to present their ideas of training objectives of specific jobs. If this can be done tactfully and in a matter-of-fact manner, it will generally provide a viewpoint toward training objectives that would otherwise be lacking.

4. Testing Service or Production.

A final method of determining training objectives as stated by Mr. Greene is to determine from actual records of plant operation the departments and jobs that indicate a need of better training. Though the specific method of going about the collection of this information will be discussed more fully in a subsequent section of this paper,(1) the information provided is an important aid in the determination of training objectives of a particular industry or plant.

THE TECHNIQUE OF EVALUATING EFFECTIVENESS OF EMPLOYEE TRAINING PROGRAMS.

Assuming now that definite and specific training objectives

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(1) Cf. pp. 102

have been determined, the next step is to describe the techniques and procedures that can be utilized in actually measuring the effectiveness of training programs in terms of attainment of their objectives. This naturally presents many different problems, but the task of evaluating training programs is by no means an impossible one. Though such statements as "Human beings are complex affairs," [1] or "Building men cannot be measured as can building machines or garments or furniture" [2] might be made in opposition to a program designed to evaluate training results, nevertheless, there do exist certain measurements which can be adopted and which generally give satisfactory although sometimes crude measurements of effectiveness.

Investigation of this type is designed primarily to answer the question: "Does the training program provide the necessary training as required by the training objective?" But first, an important point must be mentioned which the management research investigator might encounter in this connection. Careful thought must be given to the selection and collection of data that will provide necessary information in order that the actual cost of making the study will not exceed the cost of the training itself. Existing data should be utilized as far as possible so that additional expense is kept at a minimum.

The particular approach to an evaluation of a training program is necessarily affected by the size and character of the

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(1) Greene, J. H., op. cit., pp. 259.
(2) Ibid., pp. 259.

business. For example, new employee training in plants such as the American Rolling Mill Company or the Republic Steel Corporation raises special problems not only because of the character of the work involved but because of the multitude of specific tasks or occupational levels which are embraced by the companies' activities.(1) In such instances, it is usually impossible to evaluate general over-all training policies directly, thus making it necessary for the management research investigator to limit his approach to include only training activities of a specific department or occupational level at any one time. By treating each particular problem separately, he is finally able to come to some conclusion as to all-round training effectiveness. In any event, the specific techniques that are stated below are just as effective in measuring training effectiveness of particular departments or occuptions in large concerns as they are in evaluating over-all effectiveness of training in smaller or more homogeneous enterprises.

With these points in mind, the management research investigator can now turn to the actual problem of evaluating the effectiveness of training programs. Specific procedures will be discussed below under two principal headings.

1. Tangible Evaluation of Effectiveness of Training Programs.

Here the task of the management research investigator is to provide objective measurements of training results. Such

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(1) Balderston, C. C., Executive Guidance of Industrial Relations, pp. 18.

criteria are most effective in evaluating training programs, but, as one authority points out, too much stress should not be laid on these objective measurements. This authority says, "I would rather have a qualitative evaluation of a training program than to attempt to set up laboriously and at considerable expense some quantitative measurements."(1)

Thus the management research investigator is faced with the necessity of determining, inexpensively and largely from existing records, such objective measurements that are pertinent to the situation.

Messrs. Charters and Whitley have outlined two general procedures to follow in utilizing these measurements.(2) First, "Before-and-after measurements," which, as the phrase indicates, simply implies comparison of achievement after training with achievement as recorded before training. Second, the "Control-Group" plan. This method is generally not applicable to present-day operating demands and as suchhas little value for the management research investigator. In brief, this plan of measurement consists of using two groups, supposedly identical, of which the first group is not trained for the work to be performed, but the other group is given the training. Theoretically the idea is that the effectiveness of the training program can be evaluated by comparing the results of the two groups. Obviously this is an impractical method of measurement.

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(1) Greene, J.H., "How Can the Effectiveness of Training Programs be Evaluated," Personnel, August 1935, pp. 134.

(2) Charters, W.W., Whitley, R.C., "Methods of Measuring Personnel Effort." Bulletin of American Management Association, 1924.

To these methods of measurement, as stated by Messrs. Charters and Whitley, there can be added another method which for practical purposes is generally sufficient. This is termed the "trend" method. The procedure is simply to ascertain trends of specific objective measurements in order to determine in what direction major movements are taking place and the probable effect of training or lack of training on these movements.

In general, tangible evidences of the effectiveness of training programs include the following factors:

a. Output. The effect of training upon output can be easily determined by inspection of individual and departmental records of production. If output of newcomers is increased, as measured especially by comparison of actual to standard rate, the management research investigator has a valuable measurement of general effectiveness of training for the job. Likewise, in other lines of business such as retailing, where training is especially important, sales or selling costs can be examined to see whether or not the training program was achieving its objectives. An interesting although somewhat unusual example of training results once occurred in a Philadelphia department store, where a manufacturer sent a single sales instructor to train a group of sales people in the selling procedures effective in presenting a particular garment. The results are shown in the table below.

The Effect of One Training Talk
to B. F. Dewees Company Sales Women
by Vanity Fair Silk Mills Representative (1)

Date	No. of Garments Sold
June 5	84
June 6	150
June 7	194
June 9 (the morning the instructor gave the talk)	355
June 10	383
June 11	384
June 12	247
June 13) June 14).....	610
June 15	355

This certainly is an example of effective training for that particular situation.

b. Spoiled Work and Errors. The effect of training of new employees upon quality of work can usually be judged from waste and spoilage records. If such errors tend to exceed standard for a longer period than necessary, a good indication is provided of the need of more effective training, especially if further investigation indicates that increased spoilage percentage is not due entirely to faulty materials or machines.

c. Service Complaints. A record of service complaints provides a very good indication of training effectiveness. This factor need not always depend, though, on complaints which have been voluntarily registered. As pointed out previously, in connection with personnel procedures,(2) large companies dealing directly with the public often conduct specific surveys among

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(1) Reported in Greene, J. H., Organized Training in Business, pp. 270.
(2) Cf., pp. 84.

their customers for the purpose, among others, of evaluating the effectiveness of their training programs.

d. Promotions. A fourth technique utilizing objective measurements of training effectiveness is the examination of promotion records of various individuals to determine, if possible, something of the worth of the training foundation which contributes subsequently to advancement. Often in comparing promotional records of different departments, various training programs and procedures can be compared and evaluated.

e. Labor Turnover. The effect of training on labor turnover is obviously important and provides an excellent measurement for evaluating general effectiveness of training programs. This factor should not only be considered for the plant as a whole, but also for specific departments and jobs within the plant. As pointed out previously,(1) dissatisfaction or incompetence resulting in increased labor turnover is often due to improper training methods. Accordingly, a detailed study of labor turnover should provide much valuable information in evaluating the effectiveness of training programs.

f. Length of the Training Period. Obviously, the effectiveness of training in shortening the period for learning the job is an important factor in itself in evaluating the worth of a particular training procedure. If a record of the learning period shows a continual reduction in time required for training

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(1) Cf., pp. 91.

and if other factors such as rate of output and spoiled work do not offset these gains, the training program as constituted can be considered to be generally effective. If not, and methods and materials have not greatly changed, the reverse, of course, is true.

2. Measuring Intangible Evidences of Effectiveness of Training Programs.

Obviously, it is not always possible to utilize objective measurements along the lines suggested above. Furthermore, the cost of such investigation might be out of line with any advantages that might be gained from such a study. Accordingly, intangible evidences of the effectiveness of training programs -- factors which cannot be definitely measured -- are important to the technique of research of this character. Not only is an evaluation of this type often useful as a substitute for tangible measurements, but it is valuable also as a supplementary phase of an objective study. Subjective measurements, while probably not as valid from a scientific basis as objective measurements, are useful in the final determination of the effectiveness of a training program. From the standpoint of research technique, such intangible evidences that are useful to the management research investigator are presented below under three headings:

a. Esprit d' Corps. A co-operative and single-purposed attitude of a group of employees taken as a whole con-

stitutes an important attainment of an effective training program. Usually the "esprit d' corps" of an employee group can be judged fairly accurately; lack of this spirit is also usually evident. Thus the management research investigator, either through his own relations with employees or through conversation with outsiders and executives, can determine to some extent the value of training procedures, as such procedures contribute to "esprit d' corps". One store executive has said: "I do not need concrete evidence of the effectiveness of training. If I walk around in the store and see that there is an atmosphere of interest, I know that things are going satisfactorily with the training department."(1)

b. Attitude of Individual Workers and Supervisors. It is often possible to employ a second means of determining intangible evidences of effectiveness of training programs. If it has been known that a particular supervisor or worker was previously antagonistic to a training program or procedure, his subsequent reaction, either to the same procedure or to an altered program, constitutes an important means of determining human or intangible measures of effectiveness. The technique of obtaining this information suggests itself, although this method, of course, can be used only under conditions as stated above.

c. Attitude of Members of Training Group. The final bit of information important to the management research investigator in evaluating training programs consists of determining

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(1) Reported in Greene, J.H., Organized Training in Business, pp. 259.

reactions to the program of the members of the training group themselves. The plan usually recommended is to ask members of the training group for frank criticism of training effectiveness as soon as the training has been completed.(1) Not only are valuable suggestions for the improvement of training procedure often obtained, but some indication is provided regarding the effectiveness of the training program as constituted.

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(1) Ibid., pp. 272.

PART III

CONCLUSIONS

CONCLUSIONS

IMPORTANCE OF INVESTIGATIVE TECHNIQUES TO INDUSTRY

The foregoing examples of specific investigative techniques applicable to general management situations are intended to bring out possible applications of management research. From these examples we can gain some idea of the importance of a knowledge of investigative techniques in general management fields. There is no reason why scientific methods of approach to non-technical and non-mechanical management problems should not be developed and utilized. Of course, few of these problems are as tangible as those facing the engineer or chemist, yet the same basic methods of investigation are as applicable in the one field as in the other.

The really competent executive today must have a knowledge of management research methods not only to direct his own investigations but to properly interpret and evaluate those of his associates and subordinates. This statement can be justified on several counts. First of all, experience lays down no pattern for many situations requiring a plan or policy of procedure. There was a day when management could do what their predecessors did and expect reasonably favorable results. But in today's struggle for business and constantly shifting conditions, such a policy would not always work out. For example, what sort of wage payment plan or training procedure is most desirable for a specific company or department in these days of industrial unrest and rapidly changing technical conditions? How can management correctly judge these two factors alone, not referring for the moment to the manner with

which other management problems are likewise affected. Thus there arises the necessity of some technique of investigation which will be useful under these conditions and others, to the end that management will have a more scientific basis for decision than past results which were often determined under entirely altered operating conditions.

This constructive use of management research suggests another factor which illustrates the importance of general investigative techniques to industry, that is, the recognition of the continued necessity of keeping executives posted on all conditions relating to the business. By this we do not mean merely the preparation of operating reports of one kind or another, but rather a co-ordinated series of research studies designed to evaluate, appraise and analyze the underlying facts of which such operating reports are only statements of results which appear on the surface. For example, waste percentage records are valuable control records required in some form or another by nearly all operating executives, but such records themselves are of little value except as a day-to-day picture of what is actually happening. On the other hand, data of this nature interpreted by the management research investigator in terms of organization policies, training procedures, working conditions, or personnel activities will give the executive an insight into the story behind waste percentage and thus contribute not only to the executive's knowledge of fundamental conditions affecting his business, but also to his ability to better cope with the problem.

Still another reason for the importance of management research techniques in industry is the necessity of a continual "reopening of the question," as some one has put it. This simply is another way of saying that no management situation today can be left to find its own destiny. Conditions change overnight -- leaks develop rapidly. Nothing can be left for granted. A particular problem believed solved one day will return the next with double force. A newly installed wage plan might be satisfactory at first, but suddenly develop into a festering sore spot. Accordingly, there exists a definite need in nearly every organization for some kind of a continual evaluation of basic management situations. A knowledge of management research techniques along the lines that have been suggested in this paper probably pays for itself in this respect alone.

There is still another fundamental value of management research techniques that has been suggested in the foregoing pages. This lies in the fact that the experimental attitude thus fostered has its effect on all other aspects of the business. There is inculcated in the operating organization a general pattern of thought which tends to reject unfounded opinion and biased impressions in favor of an impulse to get at the facts of the case and determine why things act as they do. Both the power of scientific methods of investigation and the ability to handle statistical evidence contribute to a more rational basis for judgment, and thus to improved managerial ability.

VALUE OF ACADEMIC TRAINING IN MANAGEMENT RESEARCH TECHNIQUES.

This leads us to a consideration of the value of academic training in management research techniques. Development along these lines is not usually a matter of experience or practice. Instead, according to H. S. Dennison and J. H. Willetts,(1) it requires intellectual training as contrasted with mechanical skill. Progress in the use of management research techniques is not so much a matter of mere knowledge of facts as it is an understanding of scientific methods of investigation and open and inquiring viewpoints. Training along these lines, accordingly, calls for changes in present-day instructional curricula which at the present time usually emphasizes the acquisition of specific knowledge rather than the acquisition of a technique of determining and evaluating such knowledge.

It can be truthfully stated that academic instruction dealing with general management practices offers little practical or vocational value to most students. In the words of Mr. Donald, "The amount of information about management which college students will obtain in a two, three, or four year course is relatively unimportant compared with what will be acquired in the first few years of business life. Its value is ephemeral, for the methods of management are developing and changing so rapidly that what is known today has become obsolete in a surprisingly short time. Furthermore, the textbook and collateral reading material used in class is too often already several years old. One need only

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(1) Quoted by Donald, W.J. in "Management Research Methods and Qualifications," Harvard Business Review, January, 1927, pp. 151.

recall the rapid development of budgeting methods or the radical change in attitude toward methods of employee training to illustrate this point." (1)

To this statement can be added other factors which tend to nullify the immediate or permanent value of didactic instruction in management practices. For example, different management practices are encountered in different businesses and industrial fields. No matter how thorough or up-to-date academic instruction might be, it will never cover the ultimate interests and needs of all the members of a particular group. By way of illustration, methods of material control vary widely as between a large textile mill on the one hand and a small machine shop on the other hand. Since the same is true for every other element of present-day management instruction material, it is difficult to justify a factual or vocational approach to academic instruction in management practices. Furthermore, a student almost always enters the employ of a company in a subordinate position, acquiring the necessary knowledge of management practices by actual experience regardless of what his academic training in management procedures might have been.

On the other hand, directed training in investigative techniques as applied to management practices provides a vocational tool not only immediately useful upon entering a business but adaptable to almost any kind of business or situation. An

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(1) Ibid., pp. 152.

experimental point of view and a knowledge of research techniques are a permanent acquisition and serve in many situations. A student thus equipped is in a far better position to advance than one acquainted only with a general and usually anti-dated knowledge of management practices.

A SUGGESTED EDUCATIONAL PROGRAM.

If such is the case, what sort of a specific educational program can achieve the desired results? How can intelligent training in terms of a technique of investigation as applied to general management situations be acquired? This problem, of course, is a difficult one to approach because no conclusion can be drawn regarding any educational program for academic training in investigative techniques until the suggested plan is actually put into operation and the results surveyed. But a few basic principles, stated below, readily suggest themselves.

In the first place, this training can be achieved without a great deal of change in present-day curricula by stressing in present courses the importance of a technique of getting at the information required, rather than emphasizing the factual information itself. Instead of striving for a knowledge of facts, one should make such knowledge secondary to the actual process of seeking out and verifying the facts. Such a point of view, of course, is intangible and somewhat impractical as far as any specific or directed effort to attain it is concerned. It is something inherent in the teacher himself to be transmitted by

implication to the student. On the other hand, no matter how idealistic such a method of teaching might be, it is not something to be ignored. Throughout any course, there are many opportunities where knowledge can be subordinated to the idea of a search for that knowledge. If practiced often enough, such a point of view cannot but help to contribute to a greater emphasis on the technique of getting at facts rather than on facts alone.

The second feature of this proposed educational program designed for academic training in investigative techniques consists of specific instruction in certain tools and methods required. Mathematics and statistics are, of course, the most important tools of a management research investigator, and courses in these two fields are offered in practically every college and university in the country. Training of this type is fundamental to the work of the management research investigator and deserves an important place in the determination of an educational program designed for training in investigative techniques.

Accounting methods and procedures is another tool valuable for training in management research techniques. Adequate instruction in this field is also usually obtainable in most schools and colleges, but it is necessary to emphasize that the value of accounting instruction for this particular purpose lies not in the bookkeeping techniques that are usually offered but in the investigative point of view which it should create in the mind of the student.

After all, accounting procedure is a means or method of breaking down a business into its profit and loss elements. Accordingly, accounting instruction should be used for that purpose. As Mr. Donald suggests: "Accounting should be taught universally, not as an equipment for keeping a set of books but as a technique of management research."(1)

There is still another field of knowledge which should have an important place in an academic program of this nature, and that is the subject-matter generally known as management engineering. A recent examination of management courses offered in nearly one hundred universities and colleges in this country(2) reveals a gradual growth in the number of management engineering courses offered in these institutions. This development was pioneered in the Industrial Management Department of Massachusetts Institute of Technology where a course of this nature has been offered since about 1921.

The subject-matter of such a course is usually non-mechanical in nature. It generally covers a wide range of management and production problems such as economic lot size determination, equipment economy, etc. Such a course, if designed to take into consideration the relative inexperience of the average student in actual production problems, provides a point of view and a grasp of investigative techniques that should prove valuable in future management work.

An educational program for training in research techniques should offer in addition to an investigative point of view

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(1) Ibid., pp. 152.
(2) Conducted by the writer in October, 1935.

and specific instruction in definite tools, some sort of practical training in the actual process of such investigations. This phase of research instruction should consist of at least three factors, as stated below.

First, the student should be acquainted with the practical aspects of business operation and some of the problems involved in the day-to-day management of an enterprise. This familiarity can usually be gained by means of a series of visits to representative factories and business houses. Such visits should not be mere sight-seeing tours but should provide, first, for a tour of the layout, and second, for a discussion with an operating executive of particular phases of the business. Such visits, of course, by no means take the place of actual experience on the job, but neverthelsss do aid a student in subsequent understanding of particular aspects of his work.

In the second place, actual practice in scientific methods of management research can be gained through laboratory problems designed to approach actual operating conditions. Projects and cases can be developed for presentation to students which will provide an admirable introduction to actual conditions under which the student will later work.

Then as a final step, an educational program should include opportunity for actual field work and experience in management research. It is entirely possible to work out co-operative arrangements with factories and business houses whereby advanced students can have an actual part in the investigation of specific management

problems. Mr. Donald says: "Faculty and students must have real problems to investigate if the technique of investigation is to be imparted so successfully that it becomes a permanent equipment of the student."(1)

VOCATIONAL OPPORTUNITIES AND REQUIREMENTS IN THIS FIELD.

Vocational opportunities for the student so trained in management research technique should usually be plentiful. However, as in the case of nearly all specialized branches of business management, the beginner cannot enter this field directly, but generally must come up through the organization. A man well trained in the technique of management investigation, though, would probably soon come to the attention of the operating executives. In fact, many executives are constantly on the lookout for young men so trained who, after a period in the factory or office, are usually taken on as staff assistants.

The type of man that will qualify for a position of this nature can be judged by two significant factors. First of all, such a man must be trained to use the specific method of investigation. In other words, he must possess a technique of action useful in all management situations and an approach which insures a sound basis for all investigative work. In the second place, the trained management research investigator must maintain an experimental attitude towards all information. As already stated,(2)

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(1) Donald, W.J., op. cit., pp. 153.

(2) Cf., pp. 110.

he should take nothing for granted but rather be always searching for the true facts and the proper relationships of these facts.

Successful users of scientific methods of management research will in general have a high place in executive circles. Monetary returns will usually be as high (if not higher) as average staff executives provided, of course, that results are deserving. Moreover, there has recently been a growing recognition of the professional status of such men and satisfaction thus gained is often as important as financial gain.

Continued progress in the development of a management research profession is dependent, says Mr. Donald, on two main steps:(1)

"1. The provision of a definite channel for continuous organized discussion of management research methods.

2. A more definite recognition of those competent to investigate management problems scientifically."

"When these two subjects have been fully taken up, the progress of management methods will be vastly accelerated and our universities and colleges will be encouraged to turn out the right type of trained man who will find a large body of appreciate employers."

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(1) Donald, W.J., op. cit., pp. 156.

BIBLIOGRAPHY

BOOKS

Alford, L. P., ed. "Management's Handbook." Sections 16, 24, 31. Ronald Press. New York. 1924.

Allen, C. R., "The Instructor, the Man, and the Job." J. B. Lippincott Co. Philadelphia. 1919.

Anderson, A. G., "Industrial Engineering and Factory Management." Ronald Press. New York. 1928.

Balderston, C. C., "Executive Guidance of Industrial Relations." University of Pennsylvania. Philadelphia. 1935.

Baridon, Felix E., and Loomis, Earl H., "Personnel Problems." McGraw-Hill. New York. 1931.

Brissenden, P. F. and Frankel, E., "Labor Turnover in Industry." MacMillan Co. New York. 1922.

Cornell, William B., "Industrial Organization and Management." Ronald Press. New York. 1928.

Cox, Jacob D., "Economic Basis of Fair Wages." Ronald Press. New York. 1926.

Daugherty, Carroll R., "Labor Problems in American Industry." Pages 715-771. Houghton-Mifflin Co. 1933.

Donald, W. J., ed. "Handbook of Business Administration." Section 3, Chapter 9; Section 5, Chapters 1, 5, 7; Section 6, Chapters 2, 3. McGraw-Hill. New York. 1931.

Dutton, Henry P., "Principles of Organization." McGraw-Hill. New York. 1931.

Egbert, J. C. et al., ed's. "American Business Practice." Parts 30, 31, 37. Ronald Press. New York. 1931.

Eidmann, Frank L., "Economic Control of Engineering and Manufacturing." McGraw-Hill. New York. 1931.

Grant, Eugene L., "Principles of Engineering Economy." Ronald Press. New York. 1930.

Greene, James H., "Organized Training in Business." Harper's. New York. 1928.

Hersey, R. B., "Workers' Emotions in Shop and Home." University of Pennsylvania Press. Philadelphia. 1932.

BOOKS (continued)

Kelley, Roy W., "Training the Industrial Worker." Ronald Press. New York. 1920.

Kimball, Dexter, "Principles of Industrial Organization." McGraw-Hill. New York. 1933.

_____ "Industrial Economics." McGraw-Hill. New York. 1929.

Knoeppel, C. E., "Profit Engineering." McGraw-Hill. New York. 1933.

Leffingwell, William H., "Office Management." Chapter 6. A. W. Shaw Co. Chicago. 1925.

Lytle, Charles W., "Wage Incentive Methods." Ronald Press. New York. 1929.

Myers, Harry, "Human Engineering." Harper. New York. 1932.

National Industrial Conference Board, "Industrial Relations: Administration of Policies and Programs." National Industrial Conference Board. New York. 1931.

_____ "Industrial Relations Activities at Cheney Brothers." National Industrial Conference Board. New York. 1929.

Raymond, Fairchild, "Quantity and Economy in Manufacture." McGraw-Hill. New York. 1931.

Robinson, Webster. "Fundamentals of Business Organization." McGraw-Hill. New York. 1925.

Scott, W. D., Clothier, R. C., and Mathewson, S. B., "Personnel Management." McGraw-Hill. New York. 1931.

Shellow, S. M. and Harmon, Glenn R., "Conference Manual for Training Foremen." Pages 157-168. Harper. New York. 1935.

Slichter, Sumner S., "Modern Economic Society." Henry Holt Co. New York. 1931.

Smith, H. J., "Industrial Education, Administration and Supervision." The Century Co. New York. 1927.

Taylor Society, "Scientific Management in American Industry." Harper. New York. 1929

Taylor, F. W., "Principles of Scientific Management." Harper. New York. 1911.

Tead, Ordway and Metcalf, H.C., "Personnel Administration." McGraw-Hill. New York. 1933.

Walker, P. F., "Management Engineering." McGraw-Hill. New York. 1924.

Walters, J. E., "Applied Personnel Administration." John Wiley and Sons. New York. 1931.

Weakly, Frank E., "Applied Personnel Procedure." McGraw-Hill. New York. 1923.

Williams, Whiting, "What's on the Worker's Mind." Scribner. New York. 1920.

PERIODICALS AND PAMPHLETS

Alexander, M. W., "Cost of Labor Turnover." Bulletin, U.S. Bureau of Labor Statistics, No. 227. October, 1917.

Berg, C., "Teaching is Half of Management." Factory and Industrial Management, 84:57-8. February, 1933.

Bimson, W. R., "What Profits in the Personnel." Burroughs Clearing House. 16:17-18. March, 1932.

Bryant, L. E., "Incentives in Maintenance Work." Factory Management. January, 1933.

Bunbury, H., "Administration and the Art of Management." Chemical Age, (London) 27:380. October 22, 1932.

Burke, E. E., "New Incentive Plan for Foremen." Machinist, 39:727-8. July, 1933.

Chamberlin, Edwin, "What Workers Think." Personnel Review. 14:118-126. October, 1935.

Charters, W. W. and Whitley, R. C., "Methods of Measuring Personnel Effort." Management Methods, 53:136. August, 1924.

Clark, E. E., "Incentive Applied to Die Making." American Machinery. 75:771-4. March, 1931.

Collins, J., "Los Angeles Railway Finds Instruction Pays." Electrical Traction. 29:221-3. August, 1933.

Cowdrich, E. S., "Foremen Training in American Industry." International Labor Review. 27:207-19. February, 1933.

_____ "What's Ahead in Foremen Training." Mechanical Engineering, 54:629-32. September, 1932.

PERIODICALS AND PAMPHLETS (continued)

Curley, W. E., "Why Not Incentive for Quantity and Quality." Factory and Industrial Management, 91:124-5. April, 1933.

Diemer, H., "Management A B C's: Personnel Management." Factory and Industrial Management, 83:15-16. January, 1932.

Donald, W. J., "Management Research: Methods and Qualifications." Harvard Business Review, 11:149-156. January, 1927.

Dooley, C. R., "What Are the Trends in Wage Incentives and Other Financial Incentives." Personnel, 11:120-121. May, 1935.

Dutton, H. P., "Wage Incentive Plan You Ought to Have." Factory and Industrial Management, 83:449-51, December, 1932.

_____ "Employee Training." Factory Management and Maintenance, 94:S:131 February, 1936.

_____ "How to Install and Operate a Foreman Training Plan." Factory and Industrial Management." 3:379:80. October, 1932.

Elbourne, E. T., "Workshop Organization and Management." Engineering, 136:32. October 19, 1934.

Fenney, B., "Cadillac Profits from Training its Foremen Systematically." Iron Age, 130-137-8. July 28, 1932.

Greene, J. H., "How Can Effectiveness of Training Programs be Evaluated." Personnel, 11:133-134. August, 1935.

Hall, A. C., "Improved Customer Relations Through Employee Training." N. E. L. A. Bulletin, 19:613-16. October, 1932.

Hathaway, K., "Applied Scientific Management; Organization and Classification." Taylor Society Bulletin, 17:229-34. December, 1932.

Hopwood, J. O., "Administration of Wages and Salaries." Personnel, 11:99-101. May, 1935.

_____ "Job Analysis and Classification in Payroll Administration." Harvard Business Review, 13:141-156. January, 1935.

Hummel, J. O. P., "Fair Wage Plan Lowers Shop Costs." Inland Petroleum, 91:55-7. September, 1933.

Hutchinson, M., "Carrying on Personnel Work in Good Times and Bad." Rubber Age, 30:487-8. March 10, 1932.

Hutchinson, W., "What Price Management?" Forbes, 21:368. March 1, 1933.

Jones, A. M., "Handling Personnel in Times Like These." American Bankers' Association Journal, 24:742. June, 1932.

Keator, S. P., "Coordination of Executive Offices for Effective and Economical Management." Oil and Gas Journal, 32:11-14. July 6, 1933.

Kempton, E. W., "Cooperative Training in the Wire Industry." Journal Engineering Education, 22:688:90. April, 1932.

Kornhauser, A. W., "The Technique of Measuring Employee Attitudes." Personnel, 99:99-107. May, 1933.

Langsner, A., "Is Now the Time to Restore Wage Incentive Plans?" Factory and Industrial Management, 92:209-10. May, 1934.

McGarvey, G. A., "Training Problems in Industry." Personnel, 12:176-189. November, 1935.

Marr, L. K., "Fitting New Employees to His Job." Railway Age, 92:739. April 30, 1932.

Marsden, H. L., "Suggestions for the More Effective Selection and Training of Older Recruits for Commerce." Engineering, 134-8. July 1, 1932.

Mooney, Paul, "How Should Facts Regarding Personnel Policies be Presented to Executives to Aid in Reading Decisions?" Personnel, 11:141-143. August, 1935.

Morgensen, A. H., "How Are You Going to Train Your New Operators?" Factory and Industrial Management, 91:351-3. September, 1933.

Morris, D. H., "What Personnel Policies are Included in a Comprehensive Industrial Relations Program?" Personnel, 11:144-145. August, 1935.

Murray, C. H., "How Armco Trains Men." National Safety Review, 26:17-18. September, 1932.

———— "What Personnel Policies are Included in a Comprehensive Industrial Relations Program." Personnel, 12:173;175. November, 1935.

Pickard, R. H., "Application of Statistical Methods to Production and Research in Industry." Chemistry and Industry, 52:1008-9. December, 1933.

Pierce, F. W., "Basic Principles of Wage and Salary Administration." Personnel, 11:111. May, 1935.

Rich, A. B., "Time Study and Wage Systems from Point of View of Production Man." Taylor Society Bulletin, 17:53-6. April, 1932.

Robinson, M. B., "Cooperative Employment as a Company Asset." Journal Engineering Education, 22:675-87. April, 1932.

Roethlisberger, F. J. and Dickson, W. J., "Management and the Worker." Harvard University, 1934.

Sanford, H. D., "Financial Incentive Wage System." Refrigeration World, 68:24-9. May, 1933.

_____ "Survey of Salary Incentive Plans." Management Review, 22:49. February, 1933.

Shattuck, S. F., "How Should Facts be Obtained and What Methods Should be used in Establishing Wage Differentials?" Personnel, 11:118-119. May, 1935.

Sheldon, O., "Management Training for Business Executives." Chemical Age (London), 28:113. February 11, 1933.

Shugert, F. E., "We Have to Train Workers and Are Glad of It." Factory and Industrial Management, 83:419-21. November, 1932.

Smith, M.W., "Fundamental Principles of Foremen Training." National Safety Review, 25:19-20. April, 1932.

Soule, R. S., "What Special Provisions Must be Made to Insure Accuracy During Data Gathering and Analyzing Processes." Personnel, 11: 146-149. August, 1935.

Stocker, H. E., "Personnel Management is Chief Factor in Cargo Handling." Inland Marine Review, 62:30-1. May, 1932.

Stone, R. W., "Personnel Management - An Appraisal." Factory and Industrial Management, 83:276. June, 1932.

Thayer, E. F., "Cutting Costs by Applying Incentives in the Production of Mechanical Rubber Goods." India Rubber World, 87:27-8. March, 1933.

Tippetts, C. S., "Fundamental Economics Involved in Wage Rates." Personnel, 11:110. May, 1935.

Towne, J. D., "Here is How to Reduce Your Costs While Increasing Wage Rates." Inland Petroleum, 90:43-7. October, 1932.

Tullis, H. H., "What Should Be the Practices Relative to Periodic or Special Adjustment of Rates?" Personnel, 11:122-125. May, 1935.

Uhrbrook, R. S., "Getting Facts for Administering Personnel Policies." Personnel, 11:131-132. August, 1935.

BOOKS AND PAMPHLETS (continued)

———— "A Psychologist Looks at Wage Incentive Methods." Institute of Management Series No. 15. American Management Association, 1935.

Vaskdal, A. and Kriger, F. S., "How Maintenance Was Organized for Incentive Payments." Maintenance Engineering, 90:98-109. March, 1932.

Walters, J. E., "What's New in Personnel Work." Personnel, 9:20-31. August, 1932.

Weart, S. A., "Recent Developments in Managerial Methods in the U. S." Engineering, 138-156-8; 210-11. August 10 and 24, 1934.

American Gas Association, "Education of Gas Company Employees." Annual Report, pages 85-95. 1932.

"Piece Rates Solve Problems," Management Methods, 61:613. November, 1932.

"Pontiac Motors Invests Millions in Training and Bonus Plan." Sales Management, 29:400. March 12, 1932.

Proceedings of Annual Conference, Pennsylvania State Department of Labor and Industry, 1921.

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